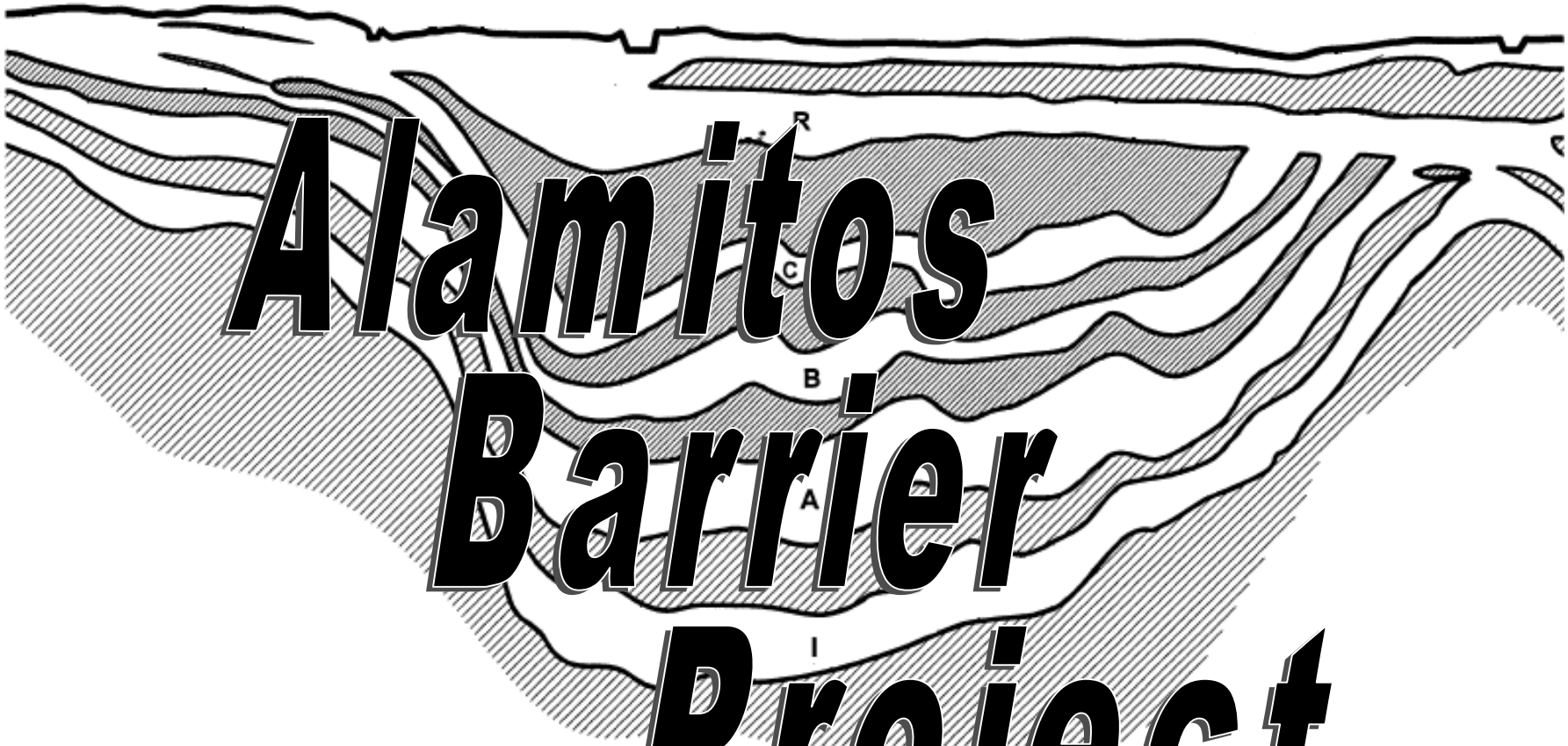

Alamitos Barrier Project

Alamitos Barrier Project

Annual report on the control of seawater intrusion

2011 - 2012

Member Agencies:

Orange County Water District

Water Replenishment District of Southern California

Long Beach Water Department

Golden State Water Company

Los Angeles County Flood Control District

Author:

Aric Rodriguez
Los Angeles County Department of Public Works

Submitted by:

Aric Rodriguez
Joint Management Committee

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INTRODUCTION

The Alamitos Barrier Project (ABP) was designed and constructed to protect the groundwater supplies of the Central Basin of the County of Los Angeles and the southwest portion of the Coastal Plain area in Orange County from the intrusion of seawater through the Alamitos Gap area. The project facilities are located near the Los Angeles-Orange County border about two miles inland from the terminus of the San Gabriel River. The original facilities included injection wells to form a freshwater pressure ridge and extraction wells to form a saltwater trough. The freshwater pressure ridge has proven to be historically effective, whereas the saltwater trough has not. As a result, the extraction wells are currently not in operation. A map showing the supply pipeline, injection wells, extraction wells, and observation wells is shown on page A-12.

The County of Los Angeles Department of Public Works (Public Works) operates and maintains the ABP and its associated facilities under the direction and approval of the Joint Management Committee (JMC), acting on behalf of the Los Angeles County Flood Control District (LACFCD) and the Orange County Water District (OCWD).

This report summarizes design and construction issues, operation and maintenance activities, hydrogeologic effects, groundwater chloride concentrations, and project costs for Fiscal Year (FY) 2011-12 (i.e., July 1, 2011 through June 30, 2012).

The JMC is aware that the current depiction of the mergence zones (first implemented in the FY 2006-07 Annual Report) conflicts with the labeled “Recent Zone Boundary.” Though it doesn’t impact data analyses, OCWD resolved this conflict and the revised background maps will be implemented in future reports.

SUMMARY

During FY 2011-12, a total of 4,334.7 AF of water was injected into the ABP (an average rate of 6.0 cubic feet per second). Of that total, OCWD purchased 1,182.0 acre-feet (27%) and the Water Replenishment District of Southern California (WRD) purchased 3,152.7 acre-feet (73%). This total injected amount is 14% less than in FY 2010-11, but is consistent with historical volumes and is 16% below the average of 5,173.5 AF for the previous five fiscal years. No major shutdowns have occurred since FY 2006-07. All minor shutdowns for FY 2011-12 are detailed in Appendix A-18.

The total costs associated with the ABP in FY 2011-12 were $6,258,821 ($6,252,602 for injection-related operations, maintenance, water, and approved LACFCD and OCWD project expenses and $6,219 for operation and maintenance of idle extraction wells). Of the total injection-related expenses, the estimated cost of the injected water was $3,883,824 ($1,066,733 paid by OCWD and $2,817,091 paid by WRD) and the total cost of services and supplies for injection was $2,368,778 ($588,352 paid by OCWD and $1,780,426 paid by the LACFCD). The corresponding services and supplies cost to inject one acre-foot of water was $546.47/acre-foot. This cost, and most of those since FY 2005-06, is higher than historical amounts because it includes costs for multiple capital improvement projects. However, this cost is very similar to that of FY 2009-10 and FY 2010-11 because of similar injection volume and total expenditures (see Table 4). The project costs are expected to vary from year to year depending on the need to repair or improve the barrier facilities. The observation well cleanout costs and injection well redevelopment costs vary each fiscal year because they are cyclical activities.

Overall, groundwater levels remained consistent or decreased slightly in all zones but the I zone, with localized decreases typically due to operational activities. In all cases, the southeast portion of the barrier remained below protective elevations due to the limited injection capabilities (quantity of wells, pressure limitations, maintenance, etc), even though the average elevations have significantly increased from FY 2010-11. West

of the San Gabriel River, chloride concentrations generally decreased with the exception of various localized increases. East of the San Gabriel River, the barrier still exhibits widespread high chloride concentrations and some wells exhibited increasing chloride concentrations. Detailed analyses of the period's groundwater elevations and chloride concentrations are provided in the "Hydrogeologic Effects" section and the "Chlorides" section.

It is imperative that the barrier operate consistently and continuously to best prevent seawater intrusion. The JMC will continue to press forward to ensure that the ABP is most efficiently, economically, and continuously protecting the region's groundwater supplies.

PROJECTS AND STUDIES

The current ABP assessment and capital improvement projects and their status are briefly summarized below. The general location of each project is identified on the map in Appendix A-12 and further project details are included in Appendix A-17.

ABP Condition Assessment

This project was jointly funded by the LACFCD, OCWD, and WRD, but was managed by LACFCD. It involved the evaluation of portions of the ABP water supply pipeline, selected injection wells, observation wells, and extraction wells. The scope of work and cost-sharing agreement were jointly developed during FY 2008-09. The project was advertised, awarded, and initiated during FY 2009-10. Field work was completed late in FY 2010-11 and the final report was completed in March 2012.

ABP, DGBP, and WCBBP Injection Well Condition Assessment

This project involved the evaluation of injection wells at all three seawater barriers. For the ABP, it includes all the injection wells not assessed during the ABP Condition Assessment. The project was advertised and awarded during FY 2009-10. The ABP

portion of the field work began and ended during FY 2010-11. The project was completed and the final report was completed in July 2012.

New ABP Observation Wells in Los Angeles County (ABP Unit 13)

This project was jointly funded by LACFCD and WRD, but was managed by LACFCD. It involved the design and construction of 8 new observation well sites, with 21 well casings, located in Los Angeles County. During this reporting period, LACFCD executed a cost-sharing agreement with WRD, completed the design phase, and advertised a construction contract. These wells will provide valuable new data to serve as reference for operations near injection well 33G, fill data gaps in each of the aquifer zones, confirm whether seawater intrusion is occurring through the B-zone mergence area (as suggested by the INTERA model, scenario 3), and replace the recently abandoned observation well 34H'38(R). Construction is anticipated to begin in December of 2012.

New ABP Injection and Observation Wells in Orange and Los Angeles Counties (ABP Unit 14)

This project is funded and managed by OCWD. It involves the design and construction of 20 new clustered injection wells, four nested observation wells and two shallow piezometers along the east leg of ABP. One injection well cluster and one nested observation well are proposed to be installed in the Los Angeles County. These new injection wells will provide additional capacity to maintain protective elevations along the east leg of the ABP. The observation wells will fill data gaps in each of the aquifer zones and help better guide injection operations. Construction is anticipated to begin in Summer 2013.

INJECTION OPERATIONS

The total amount of water injected into the ABP during FY 2011-12 was 4,334.7 acre-feet. Of this total, 49% (2,141.6 acre-feet) was reclaimed water and 51% (2,193.1 acre-feet) was imported water. The percentage of reclaimed injection was the highest it has ever been, primarily because the reclamation plant operated almost continuously during this entire reporting period. There were still a number of planned and unplanned interruptions in reclaimed water delivery, but most were very brief. There were only a few periods longer than one week where the reclamation plant was not providing reclaimed water to the ABP due mainly to maintenance activities on the reclamation plant or the ABP itself.

According to the California Regional Water Quality Control Board (CRWQCB) permit, File No. 93-076 of Order No. R4-2005-0061, the 60-month running average of reclaimed water into the ABP cannot exceed 50 percent. Through this reporting period, WRD's calculated 60-month running percentage of reclaimed water into the ABP is 32.95% and is therefore in compliance with the CRWQCB permit. Public Works' calculation through this period (which is consistent with the volumes identified throughout this report) is 31.2%. The slight discrepancy is due to differences in the timing and calculation methods of the monthly meter readings for both imported and recycled deliveries prior to April 2008.

The maximum monthly injection for this reporting period was 451.6 acre-feet (232.8 acre-feet imported and 218.8 acre-feet reclaimed) and occurred in June 2012. The minimum monthly injection of 214.0 acre-feet (194.9 acre-feet imported and 19.1 acre-feet reclaimed) occurred in December 2011 and was due to the shutdown of Metropolitan Water District's South Feeder for maintenance. The operators of LVL planned upgrades to the plant's RO unit to coincide with the planned MWD shutdown. These upgrades extended beyond the MWD shutdown until the end of the year, resulting in an unusually low reclaimed supply for the month of December 2011.

The injection volumes and costs from July through June of both FY 2010-11 and FY 2011-12 are shown in Table 1. The representative reclaimed unit costs included in Table 1 are calculated by WRD and a complete historical record of these unit costs is available from any of the agencies comprising the JMC. Table 1 shows that the injection amount for FY 2011-12 decreased by 14% from the previous year. Nonetheless, the amount of water injected at the ABP in FY 2011-12 is consistent with historical volumes and 16% below the average injection amount during the previous five fiscal years (5,173.5 AF).

The ABP operational status for FY 2011-12 is summarized in Appendix A-18. There were no major shutdowns requiring further discussion in the body of this report.

TABLE 1. INJECTION OPERATIONS

	Imported Water Injections			Reclaimed Water Injections			Total Injections		
	FY10-11	FY11-12	Percent Change From Previous Year	FY10-11	FY11-12	Percent Change From Previous Year	FY10-11	FY11-12	Percent Change From Previous Year
	VOLUME OF WATER INJECTED IN ACRE-FEET								
OCWD[1]	972.6	602.6	-38.0	711.8	579.4	-18.6	1,684.4	1,182.0	-29.8
WRD[2]	1,949.7	1,590.5	-18.4	1,432.0	1,562.2	9.1	3,381.7	3,152.7	-6.8
TOTAL	2,922.3	2,193.1	-25.0	2,143.8	2,141.6	-0.1	5,066.1	4,334.7	-14.4
	UNIT COST OF WATER PER ACRE-FEET[3]								
JULY - DEC	$778.29	$869.88	11.8	$778.29	$869.88	11.8			
JAN - JUN	$809.11	$919.88	13.7	$809.11	$919.88	13.7			
	COST OF WATER PURCHASED								
OCWD[1]	$772,727	$542,630	-29.8	$563,814	$524,103	-7.0	$1,336,541	$1,066,733	-20.2
WRD[2]	$1,551,734	$1,418,299	-8.6	$1,136,522	$1,398,792	23.1	$2,688,255	$2,817,091	4.8
TOTAL	$2,324,461	$1,960,929	-15.6	$1,700,335	$1,922,895	13.1	$4,024,796	$3,883,824	-3.5
	AVERAGE INJECTION RATE IN CFS								
OCWD[1]	1.3	0.8	-38.0	1.0	0.8	-18.6	2.3	1.6	-29.8
WRD[2]	2.7	2.2	-18.4	2.0	2.2	9.1	4.7	4.4	-6.8
TOTAL	4.0	3.0	-25.0	3.0	3.0	-0.1	7.0	6.0	-14.4

[1] Orange County Water District (OWCD)

[2] Water Replenishment District (WRD)

[3] The Unit Cost of ***Imported Water*** Per Acre-Feet is the sum of the Metropolitan Water District's wholesale rate at LB-07A (managed by Long Beach Water Department) , the $5 Administrative Surcharge, Readiness-To-Serve (RTS) costs, and Capacity costs (using total volume plus penalties). This amount is greater than what is shown on monthly invoices because Capacity costs (and RTS prior to June 2011) are not typically known or acocounted for at the time of those invoices. Based on the agreement between the OCWD and the WRD, the representative Unit Cost of ***Reclaimed Water*** Per Acre-Feet is equal to that of the imported water and is shown in the calculations by the WRD.

ADDITIONAL NOTES:

- The Unit Cost of Reclaimed Water for January through June 2012 was not yet available at the time of the Annual JMC Meeting. This value was estimated to be $919.88 by adding the July through December 2011 RTS & CC charges to the January through June 2012 imported unit cost. Therefore, both the cost of reclaimed water and the overall total cost of injection water for FY11-12 are estimates only and should not be used for any other purposes.

Figure 1 presents the monthly amounts of water injected during FY 2011-12. Figure 2 illustrates the annual amounts of water injected over the last 20 years.

FIGURE 1 - MONTHLY AMOUNT OF WATER INJECTED

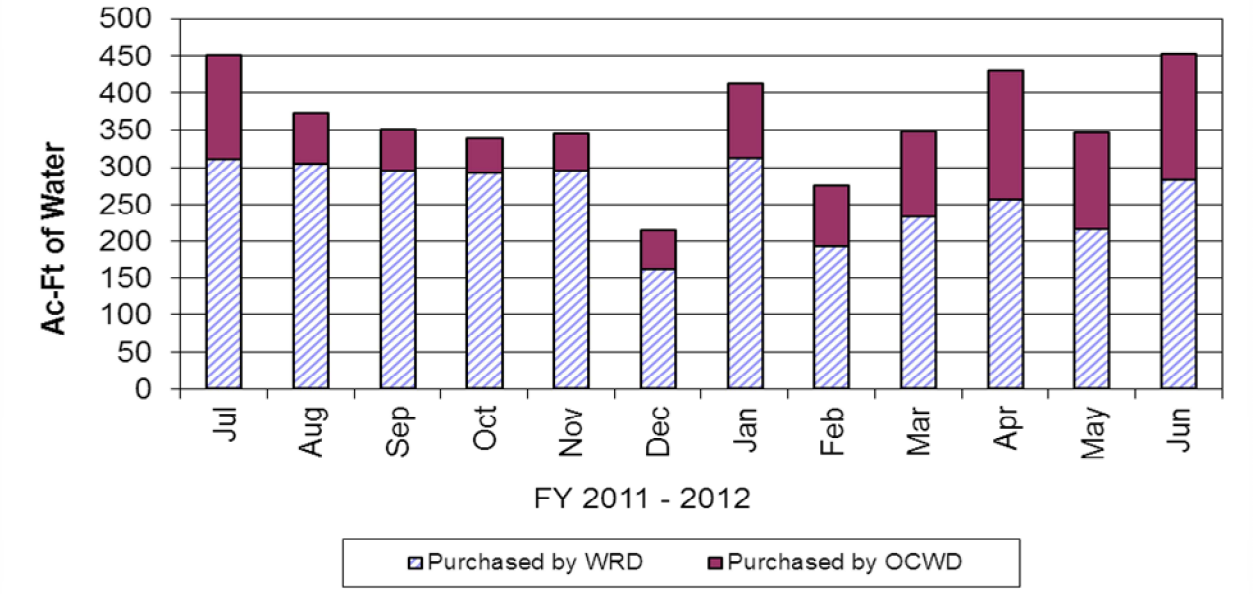
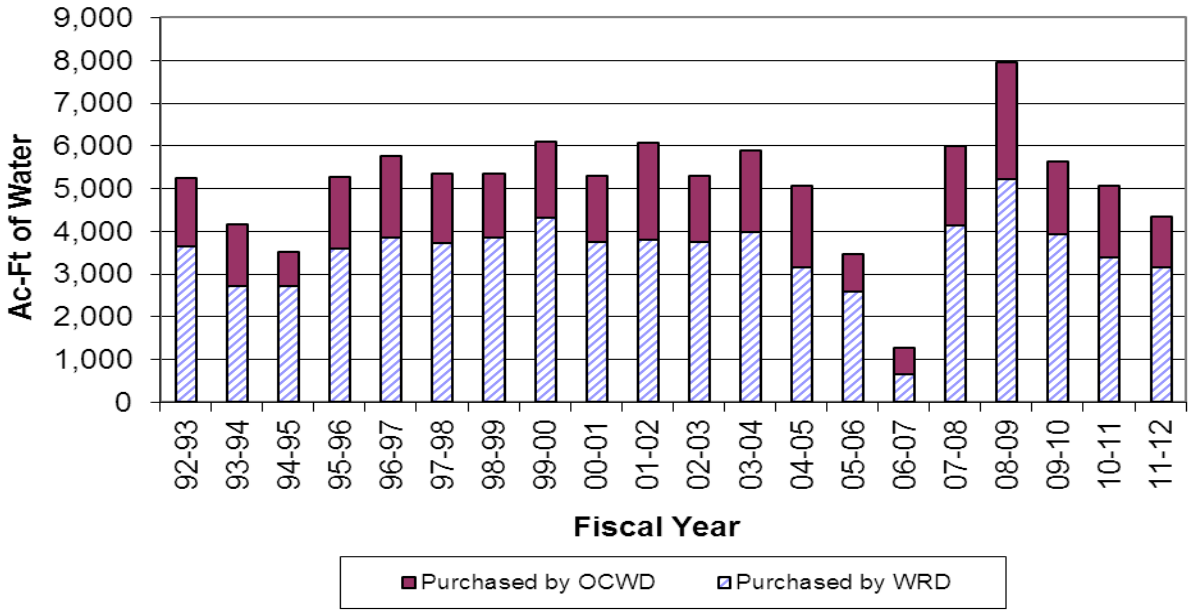


FIGURE 2 - ANNUAL AMOUNT OF WATER INJECTED



EXTRACTION OPERATIONS

There were no extraction activities during FY 2011-12. As recommended by the JMC Committee, these wells were taken out of operation in FY 2002-03. This decision was based on the results of a one-year extraction well efficiency study, which demonstrated that the chloride levels in the area decreased when the extraction wells were turned off. The extraction wells will continue to receive minimal maintenance so that they can be turned back on if deemed necessary in the future.

MAINTENANCE

Typical well maintenance at the ABP includes observation well cleanouts and injection well redevelopments. The purpose of observation well cleanouts is to remove accumulated sediment at the bottom of the well casings. Removing the sediment ensures the full lengths of the well screens are in communication with the aquifer, and also allows chloride sampling to occur at all designated depths. All 220 active observation wells are typically analyzed for sediment accumulation every two years. Following the analysis, every observation well determined to have significant sediment accumulation (i.e., covering a portion of the well screen) then receives the necessary cleanout services. Once cleanout activities are completed, each casing is bottom sounded to determine whether or not sediments were removed successfully. Recommendations are developed for the casings that could not be cleaned out, such as the well refills with sediment due to a hole in the casing or the well is packed with foreign material. During FY 2011-12, 72 observation well casing clean-outs were attempted. Of these, 59 casings were successfully cleaned out and 13 casings were unsuccessful. The results of these cleanouts will be combined with the results of the ABP Condition Assessment to create a prioritized list of wells to be replaced. A new cleanout cycle is anticipated to start in late 2013.

The purpose of injection well redevelopments is to remove accumulated sediments and microbiological build-up within the well casings to restore each well's ability to operate

at its maximum injection capacity. Each of the 45 injection and extraction well casings are routinely redeveloped once every two years. During FY 2011-12, Public Works completed redevelopment activities at the following 30 well casings[1]: 33Q(A,I), 33Q1(C,B), 33S(A,I), 33S1(A,I), 33U(A,I), 33U3(C,B), 33V(A,I), 33X(C,B,A,I), 33Y(C,B,A,I), 33Z(C,B,A,I), 33Z2(A&I), 34E(C,B), 34E(I), 34F(A), 34F(I), 34G(A), 34G2(C,B), 34G2(I), 34H(A), 34H(I), 34L(C,B,A,I), 34S(A), 34S(C,B), 34S(I), 34V(I), 34Z(I), 35F(I), 35H1(A), 35H1(I), 35H2(A).

Figure 3 depicts the operating status of each injection and extraction well during FY 2011-12 and demonstrates that the barrier has predominantly been in operation throughout this reporting period. There were three full ABP shutdowns during the reporting period, as explained in Appendix A-18. There were a few instances of nonoperation or limited injection due to surface leakage (33S1 and 33T), well redevelopments (various), video assessments of wells (33Y), and repairs (33T). In addition, a large part of the ABP's east leg was shut down from the mid-August to mid-October 2011 due to abnormally high groundwater levels in the area resulting primarily from Metropolitan Water District's in-lieu program. The transition time before and after all periods of nonoperation will continue to be minimized as much as possible.

[1] The capital letters in parenthesis represent the aquifer(s) associated with that particular injection well casing. For example, (A) = A Zone aquifer, (A,I) = A and I Zone aquifers, and so forth.

FIGURE 3 - ABP INJECTION AND EXTRACTION WELL STATUS - FY2011-12

Well No.	2011																								2012																							
	JUL				AUG				SEP				OCT				NOV				DEC				JAN				FEB				MAR				APR				MAY				JUN			
33G (A,I)																					B	B								B								B								
33J (A,I)																					B	B								B								B								
33L (A,I)																					B	B								B								B								
33N (A,I)																					B	B								B								B								
33Q (A,I)																					B	B								B								B								D
33Q1 (C,B)																					B	B								B								B						D	R	
33S (A,I)																					B	B								B								B			D	R	O	O	O	
33S1 (C,B)																					B	B					S	B	S	S	S	S	S	S	S	S	S	S	B	S	S	S	D	R	S	S	
33T (A,I)																					B	B	S	S	S	S	S	B	S	S	S	O	S	S	S	S	S	S	M	M	S	S	S	S	S	S	
33U (A,I)																					B	B								B								D	D	R	D					
33U3 (C,B)																					B	B								B							D	R	R							
33V (A,I)																					B	B								B					D	R	R	B							
33W (C,B,A,I)																					B	B								B								B								
33X (C,B,A,I)																					B	B								B			D	R	R	R		B							
33Y (C,B,A,I)																					B	B								B	D	R	R	R	D	D	D	D	B							
33Z (C,B,A,I)																					B	B				D	R	R	D	D								B								
33Z2 (A&I)																	W	O	O	O	B	B	O	O		D	R	R	M	M	M	M						B								
34D (C,B,A,I)																					B	B	M	M						B								B								
34E (C,B)															R	R					B	B								B								B								
34E (I)															R	R					B	B								B								B								
34F (A)							R	R	D	D	D	D	D	D							B	B								B								B								
34F (I)							R	D	D	D	D	D	D	D							B	B								B								B								
34G (A)	X	X	X	X	X	X															B	B							B	R	R	D						B								
34G2 (C,B)													R	R							B	B								B								B								
34G2 (I)					W								R	R							B	B								B								B								
34H (A)											R	R	R	D							B	B								B								B								
34H (I)											R	R	R	D							B	B								B								B								
34J (A&I)											O	O	O	O	O						B	B								B								B								
34L (C,B,A,I)							O	O	O	O	O	O	O	O					R	R	R	B								B								B								
34S (A)							O	R	R	O	O	O	O	O			O		O	O	B	B								B								B								
34S (I)							O	R	R	O	O	O	O	O			O		O	O	B	B								B								B								
34S (C,B)							O	R	R	O	O	O	O	O			O		O	O	B	B								B								B								
34V (A)							O	O	R	R	O	O	O	O			O		O	O	B	B								B								B								
34V (I)							O	O	R	R	O	O	O	O			O		O	O	B	B								B								B								
34V (C,B)							O	O	R	R	O	O	O	O			O		O	O	B	B								B								B								
34Z (I)			D	R	R	O	O	O	O	O									O	O	B	B								B								B								
35F (I)	R	D	D	O	O	O	O	O	O	O									O	O	B	B							B		O						B								
35G (A,I)	O																				B	B							B	O							B								
35H1 (A)																	W	D	D	D	B	B	R	R	M	M				B								B								
35H1 (I)												P	P	P	P	P	W	D	D	D	B	B	R	R	M	M				B								B								
35H2 (A)																		R	D	D	B	B								B								B								
*33V'15P	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
*34H'17P	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
*34H'18P	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
*34S'22P	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

*Extraction Well

[ ] - Well in Operation	[H] - Header Repair	[P] - Pressure Exceedance	[U] - Under Construction
[C] - Casing Repair	[M] - Misc. Repair	[R] - Redevelopment	[W] - Water Quality Sampling
[D] - Disassembled	[N] - Not Needed	[S] - Surface Leakage	[X] - Waiting for Repair
[G] - Grouted	[O] - Other Circumstances	[T] - Tremie Repair	[B] - Barrier Shutdown

HYDROGEOLOGIC EFFECTS

Figures 4 through 8 (pp. 13-17) show the average monthly groundwater elevation against the average groundwater elevation of the 10 preceding years in the vicinity of the barrier alignment in the R, C, B, A, and I Zones, respectively. Two graphs were created for each aquifer to account for changes in groundwater elevation trends along the barrier alignment: wells west of the San Gabriel River and wells east of the San Gabriel River. It is important to note that the 10-year average does not represent a groundwater elevation goal nor does it specifically reflect barrier performance, but is simply included for comparison purposes. For example, the 10-year running average included in the graphs for the FY 2011-12 report is generally higher than the one shown in the FY 2010-11 report because the FY 2010-11 data now included was generally higher than the FY 2000-01 data that it replaced. The graph includes all available semi-monthly, monthly, semi-annual, and annual data for wells within the barrier alignment and landward for approximately 2,000 feet from the barrier. As a result, semi-monthly values are "weighted" more heavily than the annuals in the calculation of the monthly average. In each figure, monthly average groundwater elevations during FY 2011-12 are compared with the averages of the previous 10 years (Fiscal Years 2001-02 to 2010-11).

As shown in the graphs, groundwater elevations in the area immediately surrounding the ABP were typically at or above historical averages throughout FY 2011-12. This was due to significantly reduced overdraft in the Orange County and Central Basins resulting from Metropolitan Water District's (MWD) in-lieu program, which resulted in above average groundwater elevations in the vicinity of the ABP during 2011. East of the San Gabriel River, groundwater elevations were above historical averages nearly the entire reporting period. West of the San Gabriel River, groundwater elevations were near historical averages in spring, and above average the rest of the year. The MWD in-lieu program in 2011, which encouraged groundwater users to purchase imported water

rather than pump groundwater, allowed for a temporary recovery of groundwater levels in the aquifer system. In addition, OCWD purchased and recharged 40,000 acre-feet of imported water during FY 2011-12.

It is noted that, in general, all the figures show the expected seasonal trends of higher groundwater elevations in the winter months (decreased pumping) and lower groundwater elevations in the summer months (increased pumping). A major exception to this historic trend is the significant drop in groundwater elevations in February and March across the ABP, which is most likely the result of a full barrier shutdown in mid-February. This decrease is more pronounced west of the San Gabriel River, and is most likely the result of this shutdown coincident with redevelopment and video assessment of wells along the west leg of the ABP.

FIGURE 4a RECENT ZONE WEST OF THE SAN GABRIEL RIVER

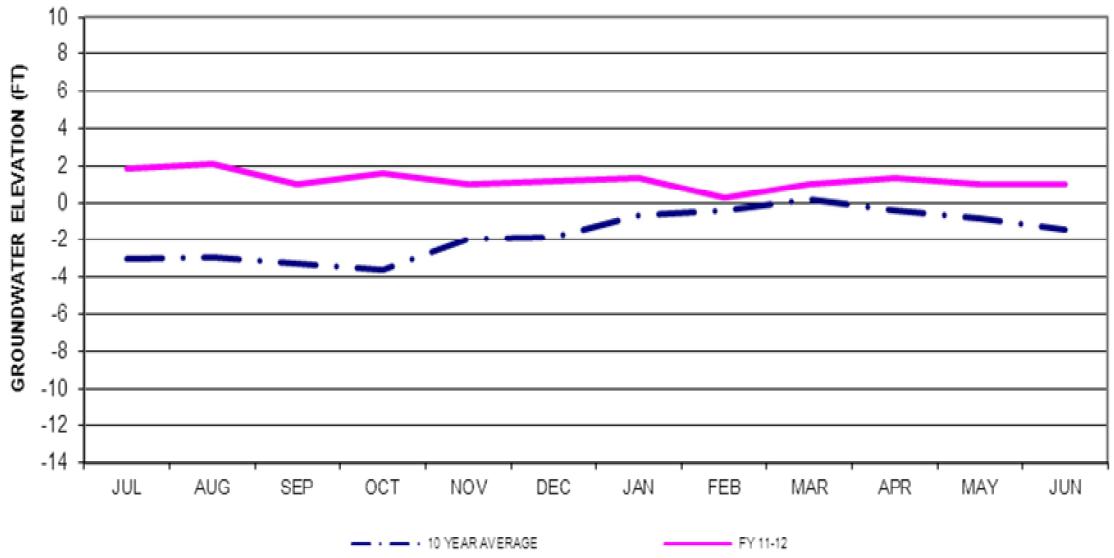


FIGURE 4b RECENT ZONE EAST OF THE SAN GABRIEL RIVER

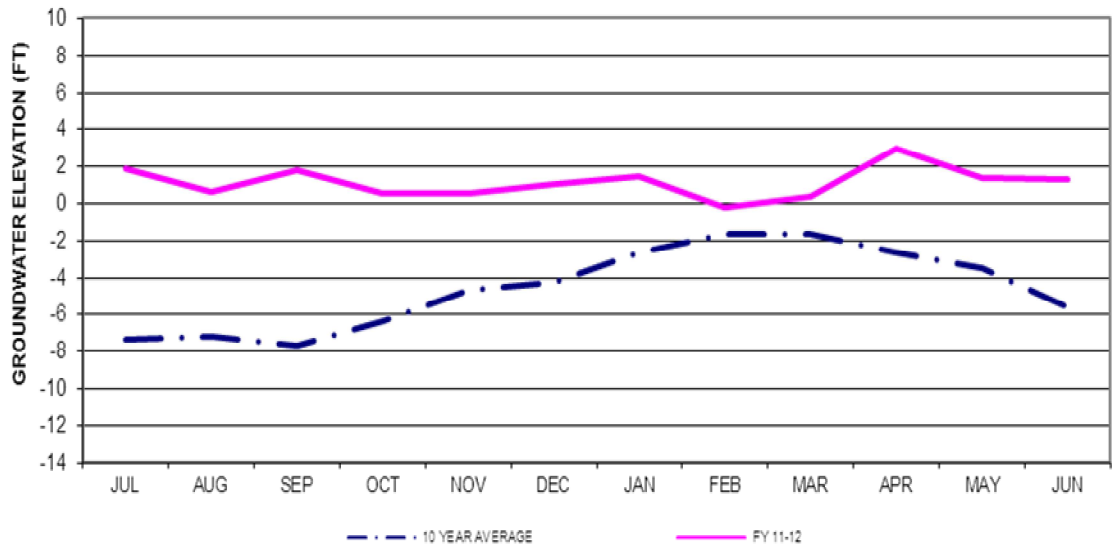


FIGURE 5a C-ZONE WEST OF THE SAN GABRIEL RIVER

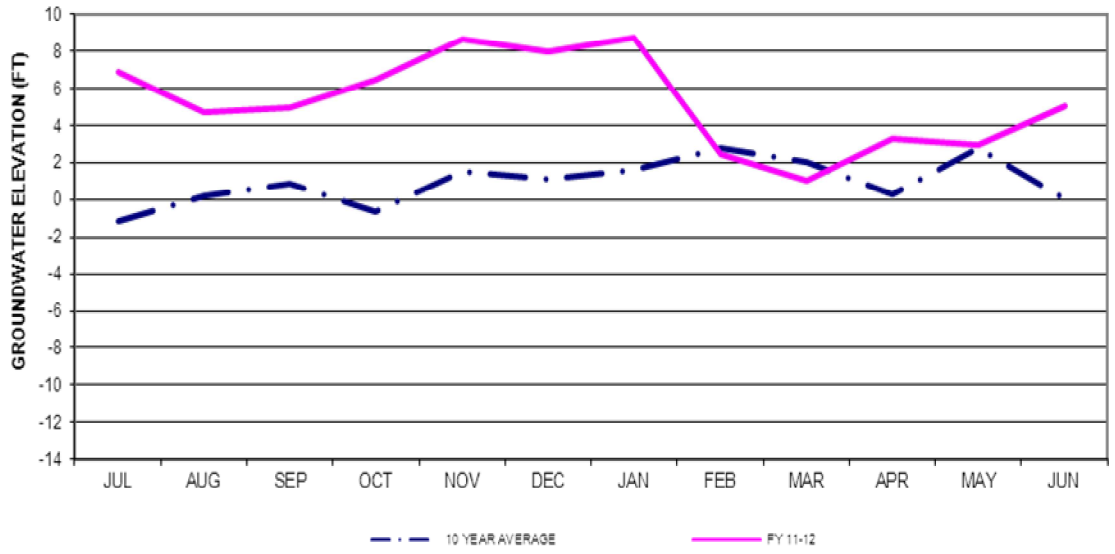


FIGURE 5b C-ZONE EAST OF THE SAN GABRIEL RIVER

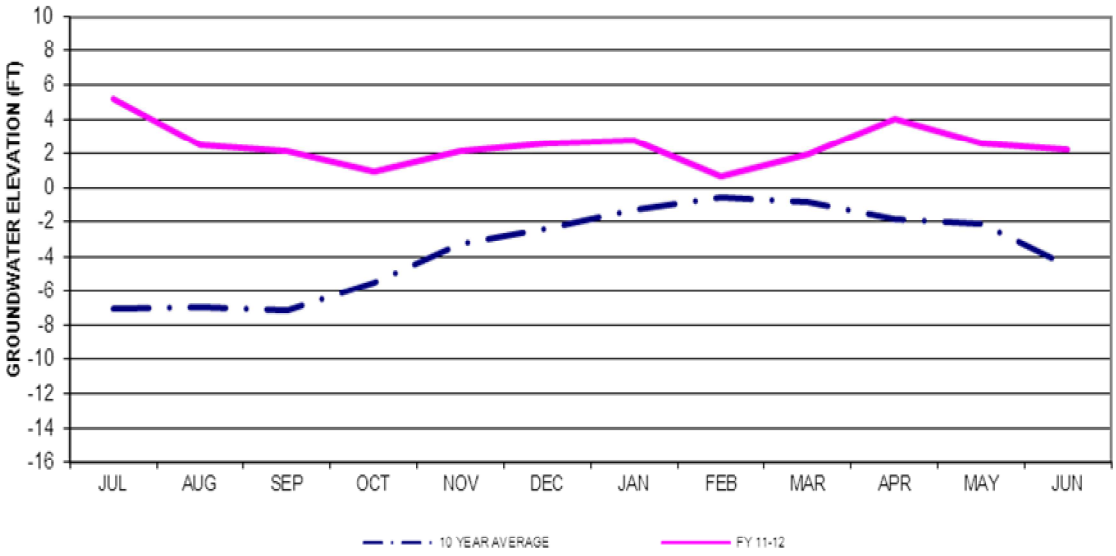


FIGURE 6a B-ZONE WEST OF THE SAN GABRIEL RIVER

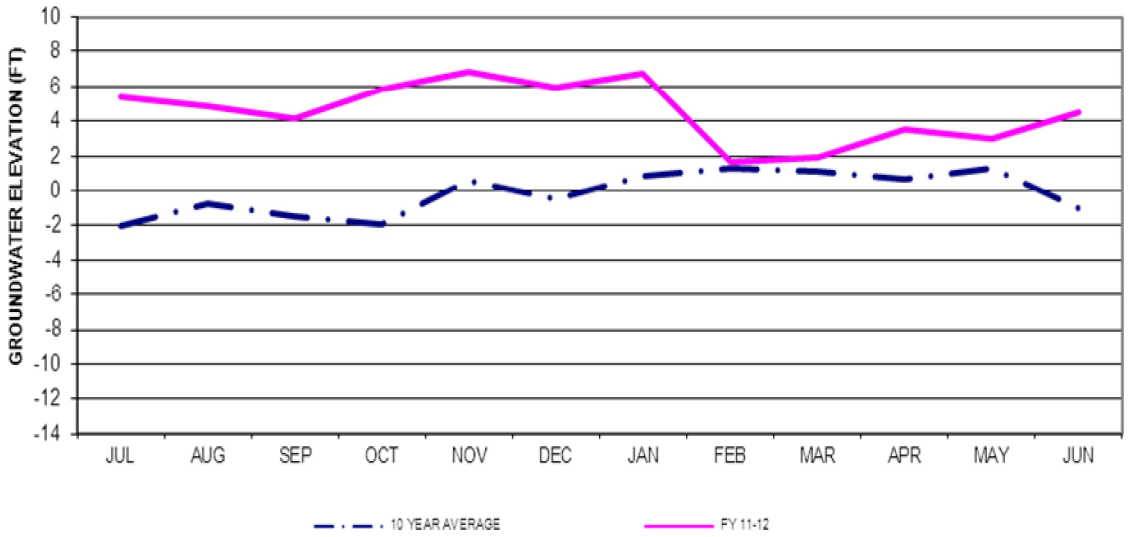


FIGURE 6b B-ZONE EAST OF THE SAN GABRIEL RIVER

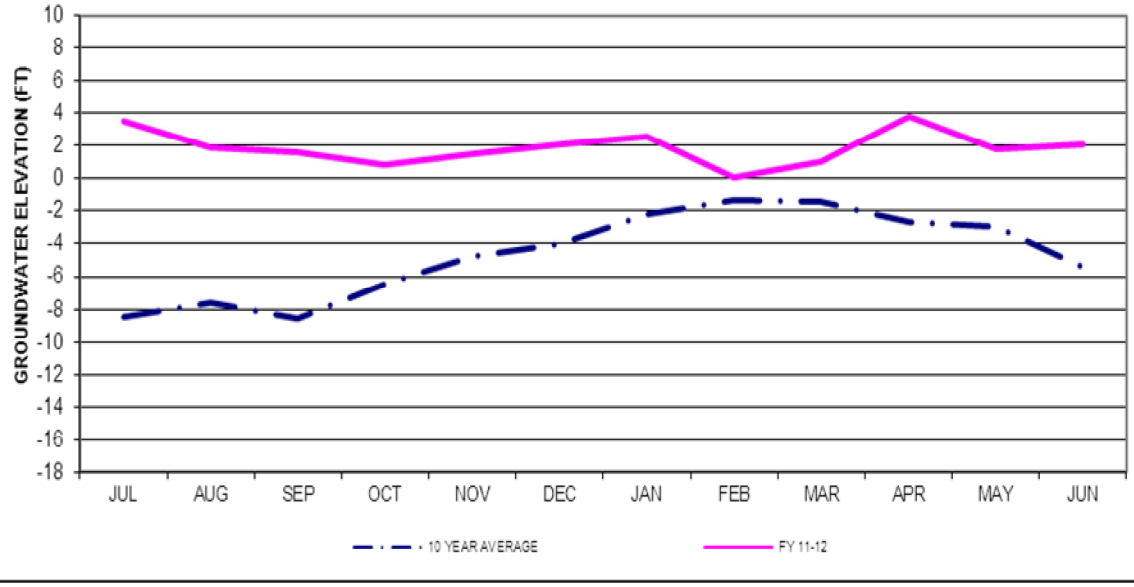


FIGURE 7a A-ZONE WEST OF THE SAN GABRIEL RIVER

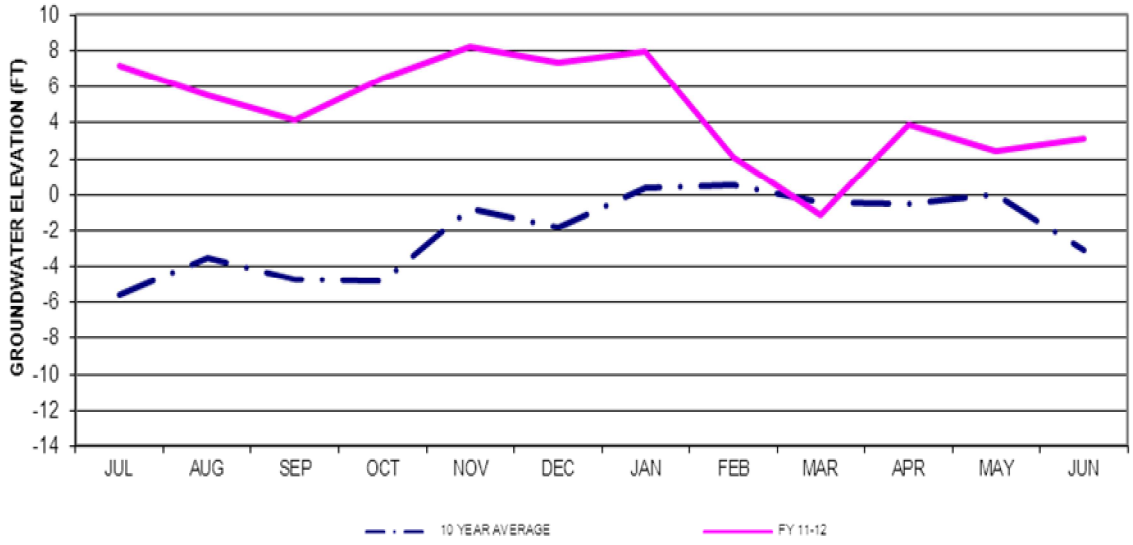
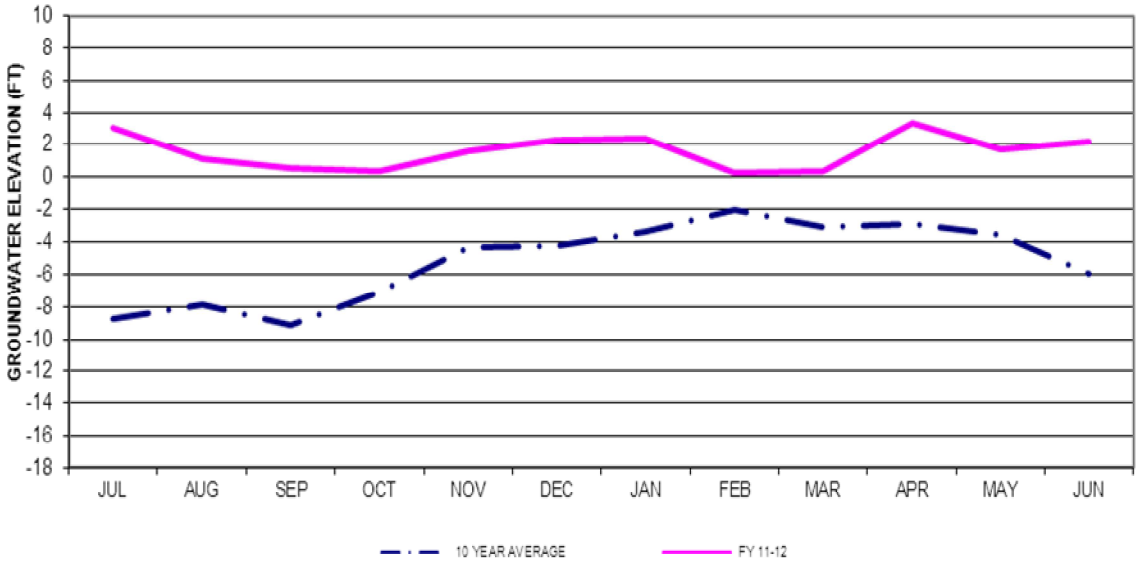


FIGURE 7b A-ZONE EAST OF THE SAN GABRIEL RIVER



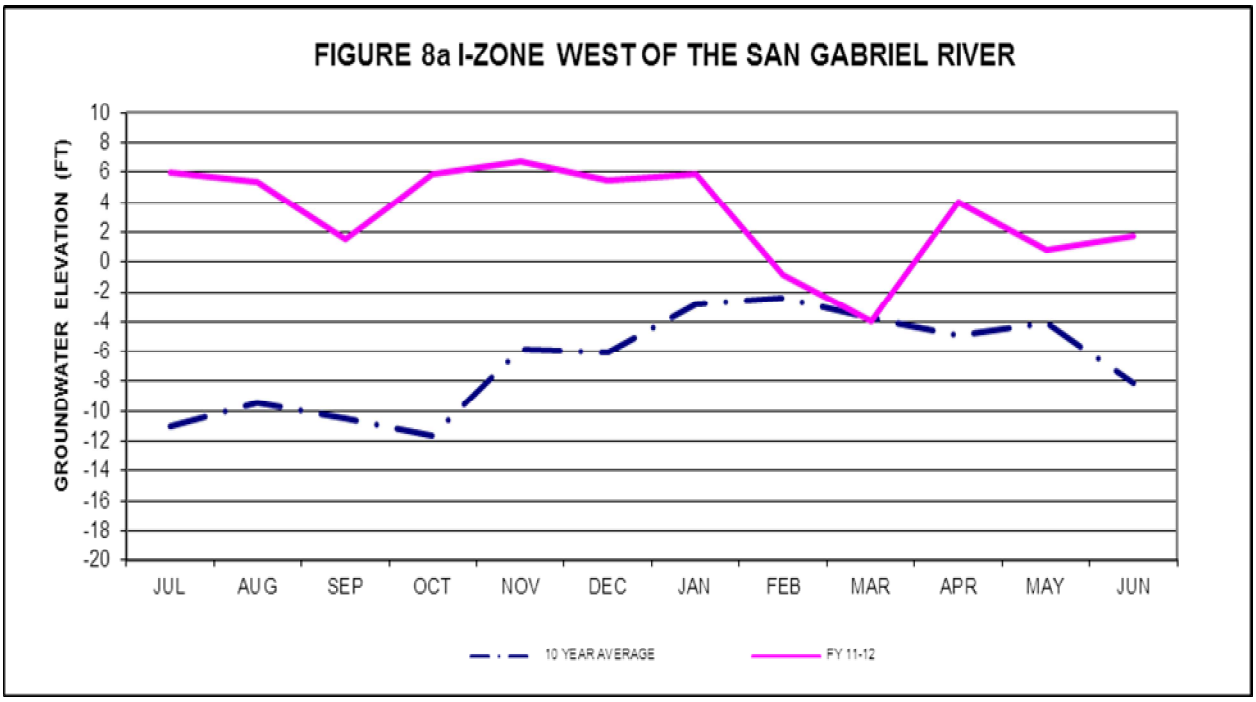


FIGURE 8a I-ZONE WEST OF THE SAN GABRIEL RIVER
GROUNDWATER ELEVATION (FT)
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
10 YEAR AVERAGE
FY 11-12

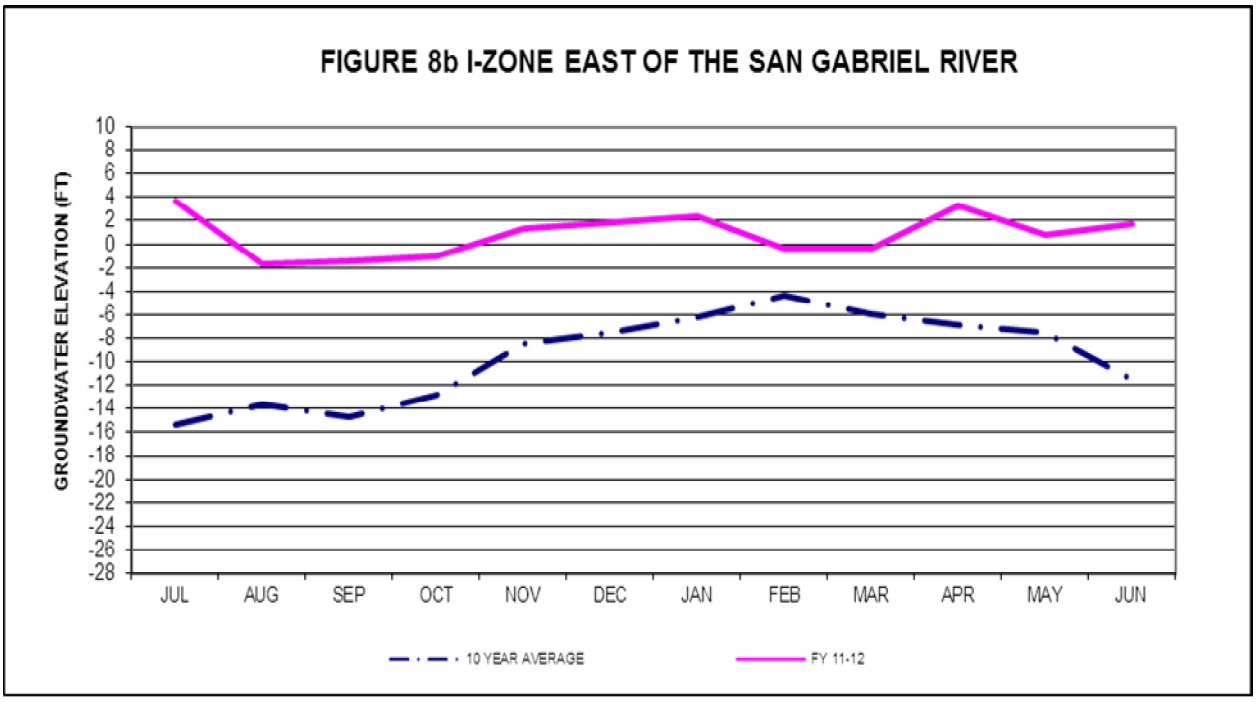


FIGURE 8b I-ZONE EAST OF THE SAN GABRIEL RIVER
GROUNDWATER ELEVATION (FT)
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
10 YEAR AVERAGE
FY 11-12

Groundwater elevation contours for the R, C, B, A, and I Zones have been prepared from data collected in Spring 2012 and are included in Appendix A-1.1, 2.1, 3.1, 4.1, and 5.1. A list of all the data used to generate these contours is also included in Appendix (A-1.3, 2.3, 3.3, 4.3, and 5.3). In general, the contours show that the groundwater levels typically decrease landward of the barrier. The general shapes of each contour are similar to the previous year and some similar groundwater mounds are seen around certain injection wells. Also, it should be noted that areas historically having higher groundwater elevations in the C and B zones, especially near the bend at the San Gabriel River, continue to have higher groundwater elevations than their surroundings. Other areas of historically elevated groundwater levels (e.g., near 33XY and 33YZ), do not appear to be as elevated during this fiscal year compared to past years. This is probably due to the February 2012 barrier shutdown in conjunction with redevelopment activities at nearby injection wells.

Groundwater elevation ***change*** contours for the R, C, B, A, and I Zones between Spring 2011 and Spring 2012 are shown in A-1.2, 2.2, 3.2, 4.2, and 5.2. The data set is based on available data from Spring 2012, which was then subtracted from the corresponding and available data from Spring 2011 (shown in A-1.3, 2.3, 3.3, 4.3, and 5.3). These contours clearly identify increases and decreases in groundwater elevations from one reporting period to the next. In general, most areas saw very little changes in groundwater elevation. Below is a brief summary and discussion of each aquifer zone:

- <u>R Zone:</u>
    - Groundwater elevations remained fairly consistent in the vicinity of the ABP.
    - Localized increases of about 1 foot occurred near the bend at the San Gabriel River and at the furthest extent of the ABP's east leg.
    - Localized decreases of about one foot occurred along the west leg and part of the east leg along Los Alamitos Channel.

- C Zone:
    - Groundwater elevations remained relatively constant along the furthest extent of the west leg, and part of the east Leg along Los Alamitos Channel.
    - Groundwater elevations increased about 1 foot along the middle portion of the West Leg, and decreased along and landward of the ABP's east leg.
- B Zone:
    - Groundwater elevation increases of up to 5 feet north of the barrier's west leg. Slight increases along the barrier's west leg and northern-most part of the ABP east leg.
    - Groundwater elevations increased along the West Leg; decreased along East Leg.
- A Zone:
    - Groundwater elevations generally increased about 2 feet across the west leg and the northern-most extent of the barrier's east leg.
    - Groundwater elevations decreased for most of the east leg downstream of injection well 34J.
- I Zone:
    - Groundwater elevations generally increased along the Barrier alignment, with localized increases over 6 feet in the vicinity of the San Gabriel River.
    - Groundwater elevations decreased slightly in the westernmost extent of the west leg.
    - Localized increase of 5 feet in the vicinity of wells 34VZ and 34T0.1.

For further analyses of the C, B, A, and I Zone groundwater elevations and barrier performance, please refer to the graphs included as Appendix A-13 through A-16. These graphs show the average, maximum and minimum groundwater elevations at each internodal observation well throughout FY 2011-12 in relation to the ground surface and the protective elevation. As shown in A-13 to A-16, the average groundwater elevation was below the protective elevation at many wells along the

barrier during FY 2011-12. However, areas of high chloride concentrations did not correlate with areas of average elevations below the protective elevation. A comparison of these graphs to the previous year's graphs indicates that overall elevations generally increased, but, similar to what was seen in the contours, there were a number of localized increases or decreases due to various operational activities. In all cases, the southeast portion of the barrier remained below protective elevations due to the limited injection capabilities (quantity of wells, pressure limitations, maintenance, etc), even though the average elevations have significantly increased from FY 2010-11. It is important to note that the JMC is seeking to remediate the limited injection capabilities in the southeast region through additional wells, modeling studies, grouting operations, and condition assessments to plan for and minimize shutdowns.

CHLORIDES

Figures 9 through 13 (pp. 23-27) show the historical chloride concentrations in each individual aquifer zone. The graphs plot the average of every maximum value measured at each observation well during each sampling event within the target area (i.e. east or west of the San Gabriel River) throughout FY 2011-12. The data includes all available information from the annual and semi-annual sampling events for wells within the barrier alignment and landward for approximately 2,000 feet from the barrier. As a result, the semi-annual values are "weighted" more heavily than the annuals in the calculation of the annual average. Two sets of graphs were created for each aquifer to account for changes in chloride concentration trends in the areas to the west and east of the San Gabriel River, respectively. In each figure, the average of the annual maximum chloride concentrations for the last 10 fiscal years (including this year) is shown with respect to the freshwater condition (250 mg/L).

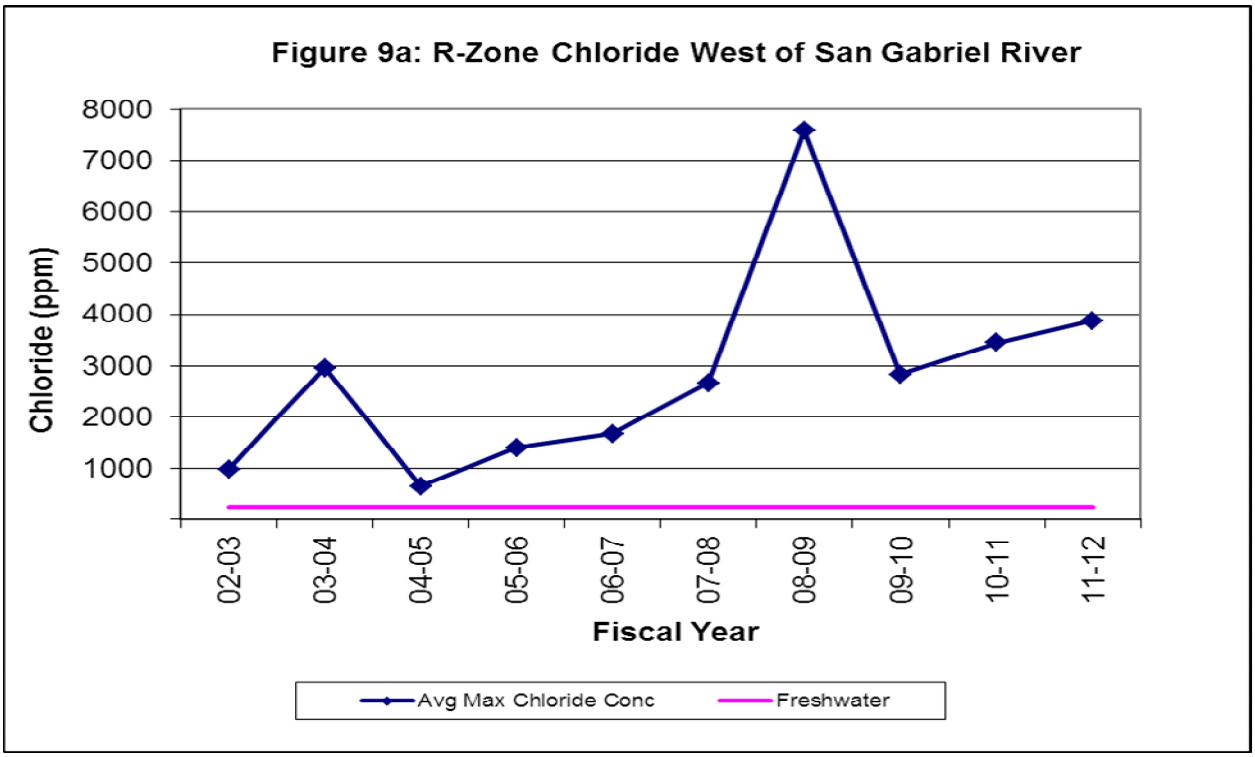


Figure 9a: R-Zone Chloride West of San Gabriel River
Chloride (ppm)
8000
7000
6000
5000
4000
3000
2000
1000
02-03
03-04
04-05
05-06
06-07
07-08
08-09
09-10
10-11
11-12
Fiscal Year
Avg Max Chloride Conc
Freshwater

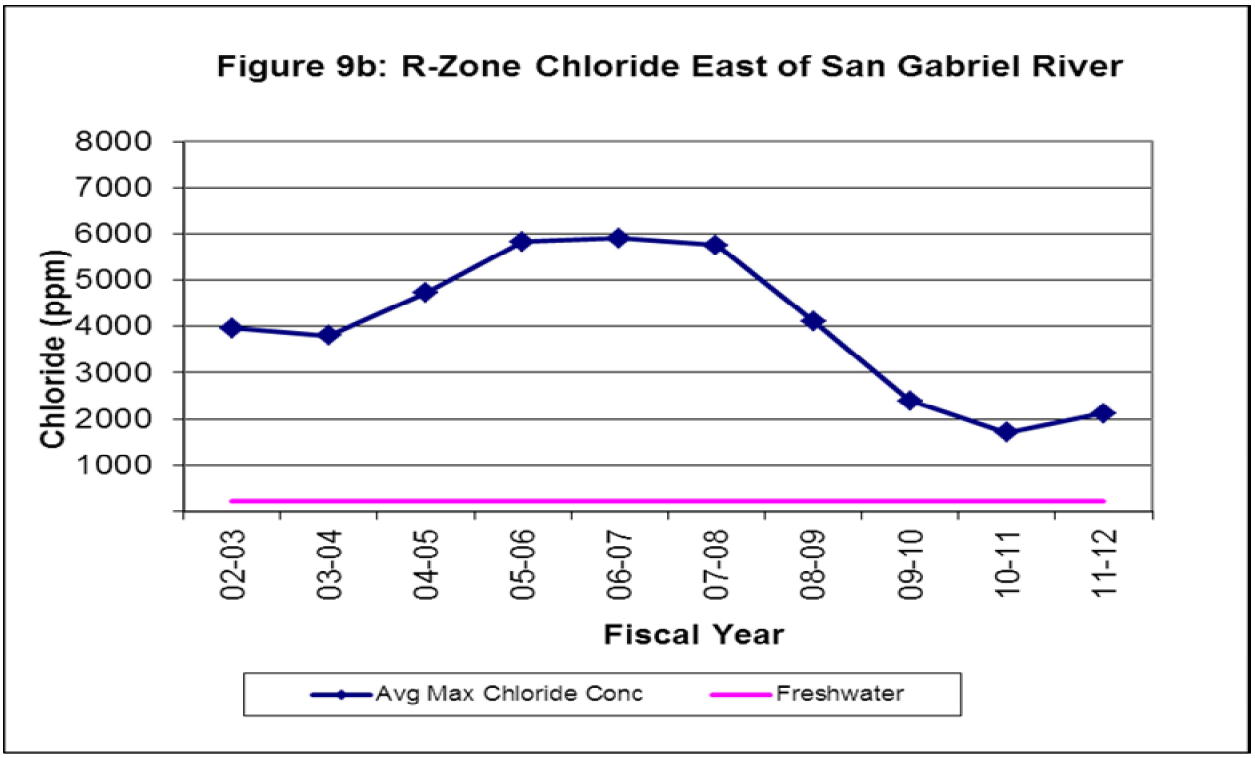


Figure 9b: R-Zone Chloride East of San Gabriel River
Chloride (ppm)
8000
7000
6000
5000
4000
3000
2000
1000
02-03
03-04
04-05
05-06
06-07
07-08
08-09
09-10
10-11
11-12
Fiscal Year
Avg Max Chloride Conc
Freshwater

Figure 10a: C-Zone Chloride West of San Gabriel River

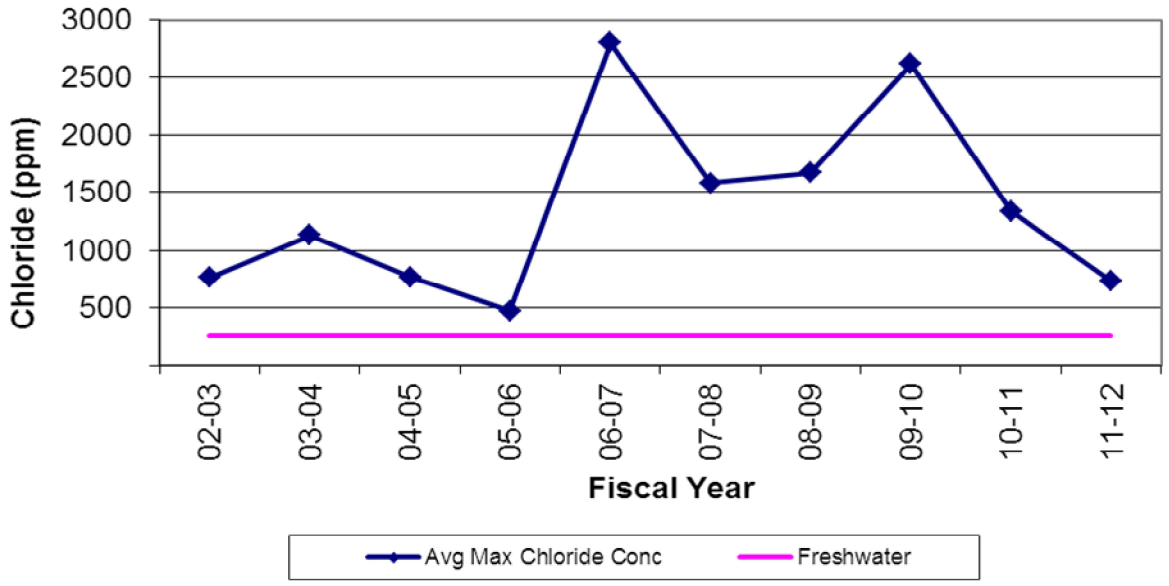
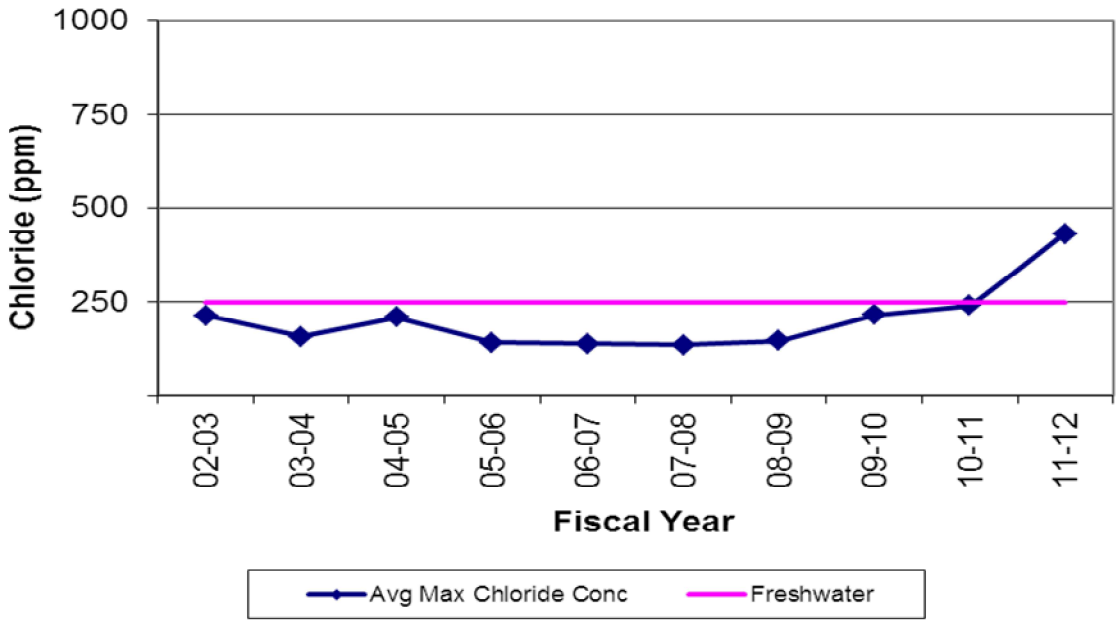


Figure 10b: C-Zone Chloride East of San Gabriel River



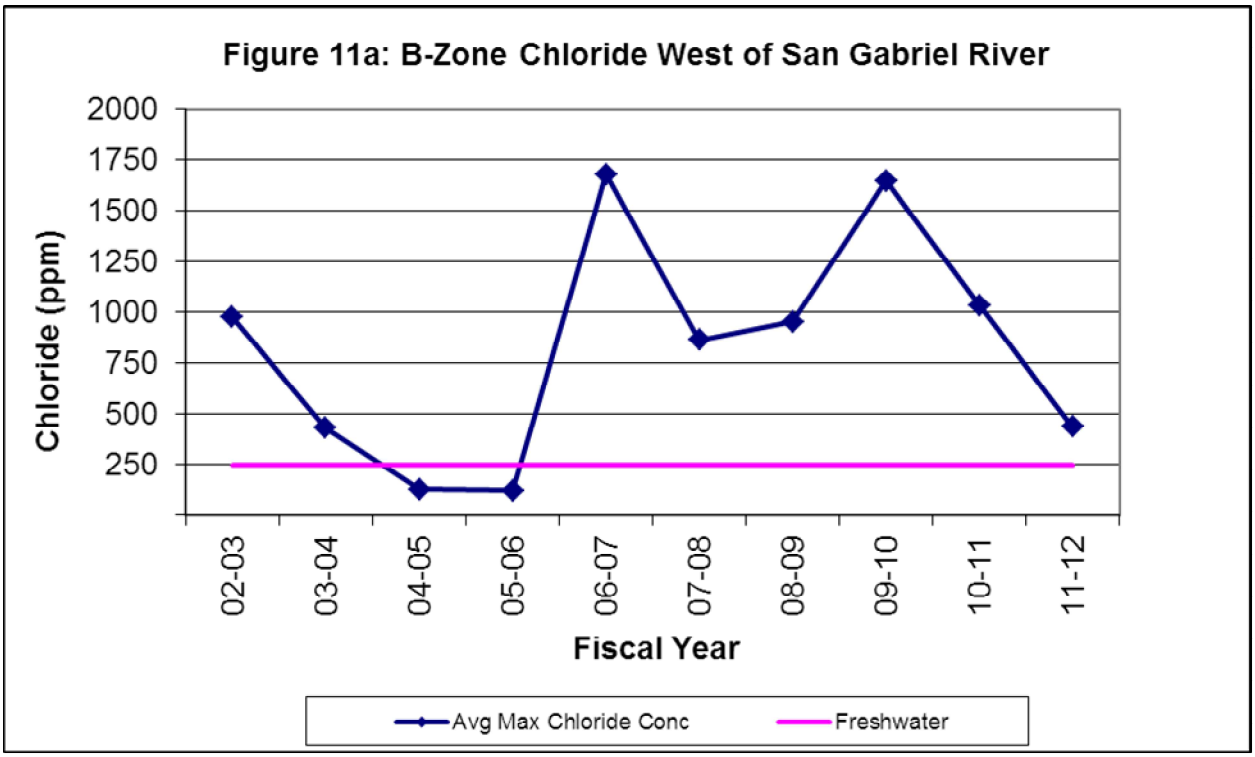


Figure 11a: B-Zone Chloride West of San Gabriel River
Chloride (ppm)
2000
1750
1500
1250
1000
750
500
250
02-03
03-04
04-05
05-06
06-07
07-08
08-09
09-10
10-11
11-12
Fiscal Year
Avg Max Chloride Conc
Freshwater

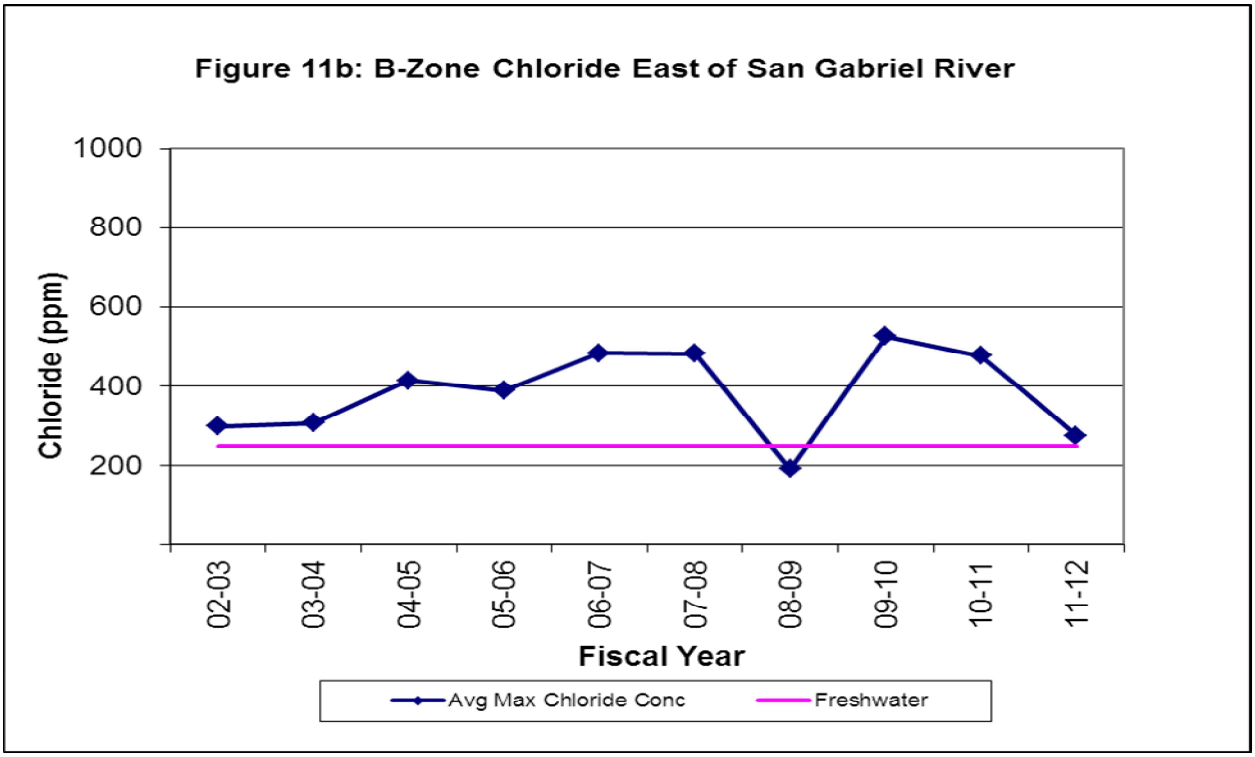


Figure 11b: B-Zone Chloride East of San Gabriel River
Chloride (ppm)
1000
800
600
400
200
02-03
03-04
04-05
05-06
06-07
07-08
08-09
09-10
10-11
11-12
Fiscal Year
Avg Max Chloride Conc
Freshwater

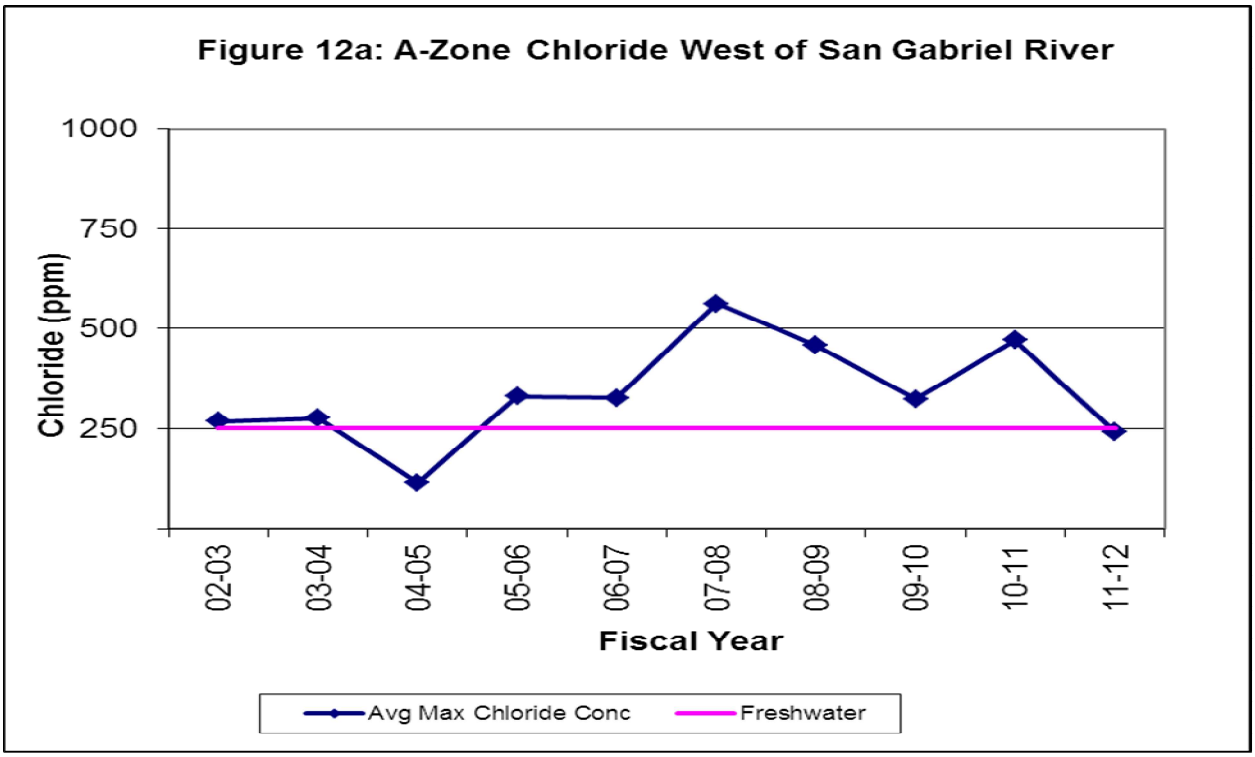


Figure 12a: A-Zone Chloride West of San Gabriel River
1000
750
500
250
Chloride (ppm)
02-03
03-04
04-05
05-06
06-07
07-08
08-09
09-10
10-11
11-12
Fiscal Year
Avg Max Chloride Conc
Freshwater

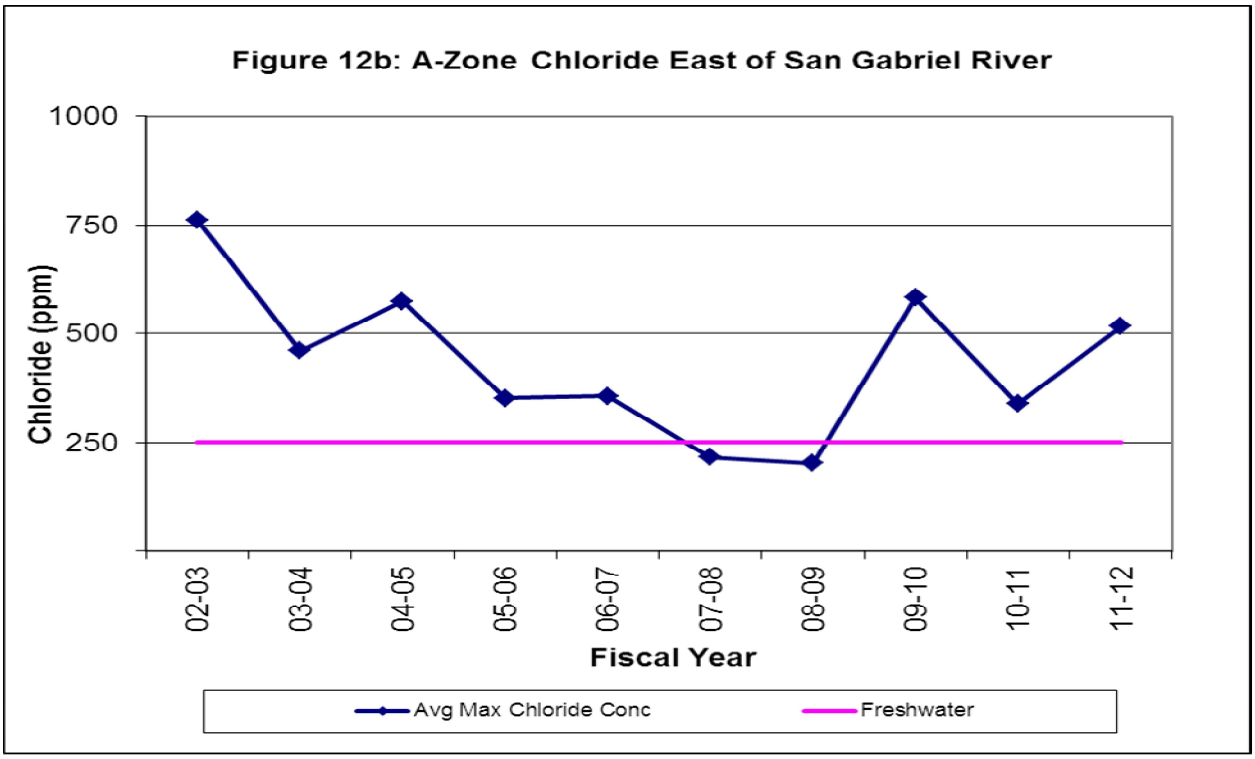


Figure 12b: A-Zone Chloride East of San Gabriel River
1000
750
500
250
Chloride (ppm)
02-03
03-04
04-05
05-06
06-07
07-08
08-09
09-10
10-11
11-12
Fiscal Year
Avg Max Chloride Conc
Freshwater

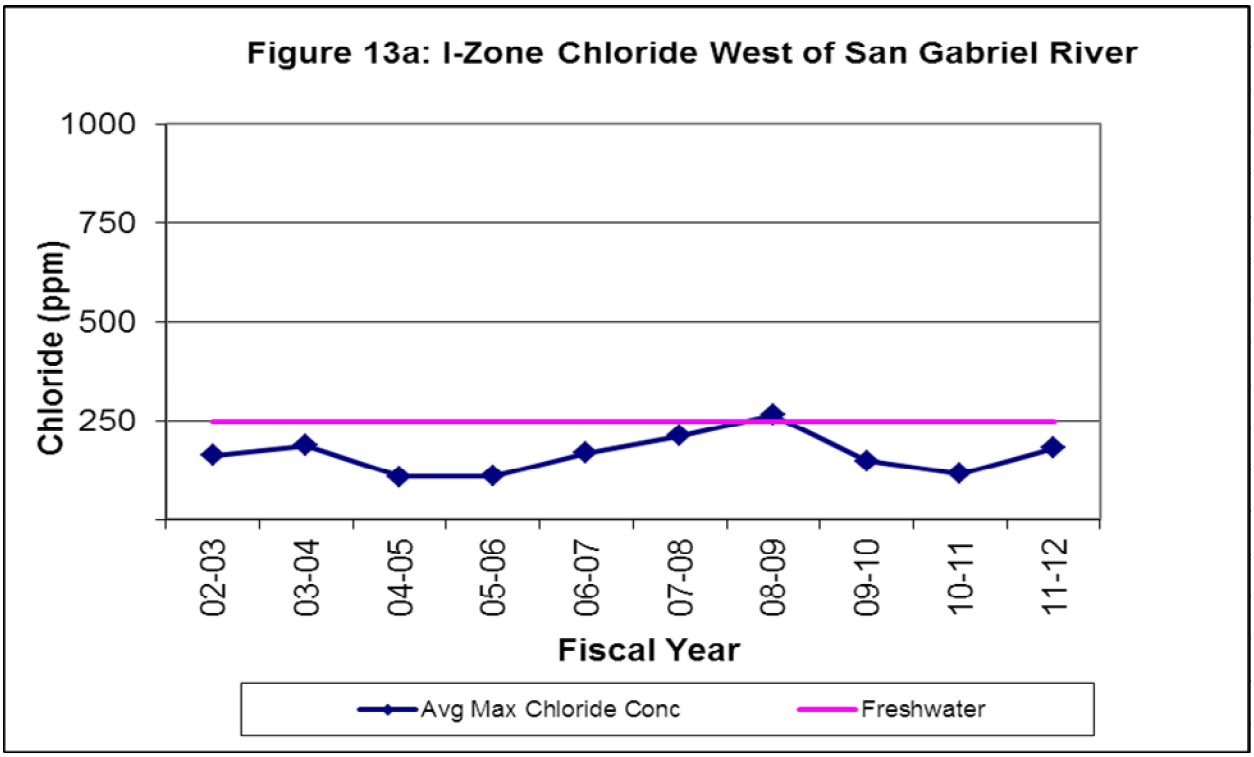


Figure 13a: I-Zone Chloride West of San Gabriel River
1000
750
500
250
Chloride (ppm)
02-03
03-04
04-05
05-06
06-07
07-08
08-09
09-10
10-11
11-12
Fiscal Year
Avg Max Chloride Conc
Freshwater

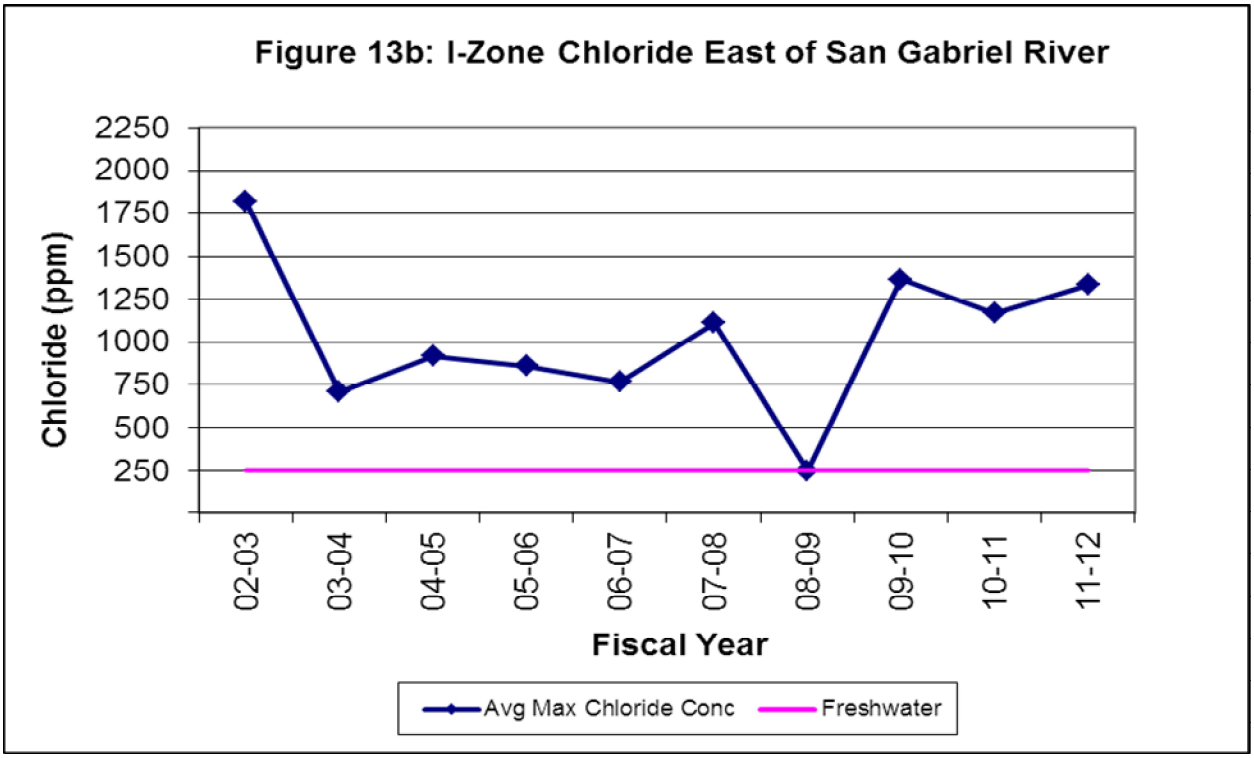


Figure 13b: I-Zone Chloride East of San Gabriel River
2250
2000
1750
1500
1250
1000
750
500
250
Chloride (ppm)
02-03
03-04
04-05
05-06
06-07
07-08
08-09
09-10
10-11
11-12
Fiscal Year
Avg Max Chloride Conc
Freshwater

West of the San Gabriel River, FY 2011-12 average maximum chloride concentrations in the C, B and A Zones decreased. The decreases were greater than 500 mg/L in the C and B zones. However, average maximum chloride concentrations in the R and I Zones showed increases of about 400 mg/L and 65 mg/L, respectively.

East of the San Gabriel River, FY 2011-12 average maximum chloride concentrations increased in every zone with the exception of the B zone. However, increases in the C, A and I Zones were all under 250mg/L. The small increase in the I zone and A zone east of the San Gabriel River could be attributed to a smaller sample set obtained during Spring 2012, when sampling of wells with consistently low chloride concentrations was curtailed due to mechanical issues with the sampling equipment.

Chloride concentration contour maps for the R, C, B, A, and I Zones have been prepared from data collected in the Spring of 2012 and are included in Appendix A-6.1, A-7.1, A-8.1, A-9.1, and A-10.1, respectively. A list of all data used for these contours is also included in the Appendix (A-6.3, A-7.3, A-8.3, A-9.3, and A-10.3). The chloride contour maps are based on the maximum chloride ion concentration (mg/L) measured at each observation well. Chloride data was gathered from observation wells located within the immediate vicinity of the barrier and does not represent basin-wide conditions for the groundwater basin protected by the barrier. Wells with chloride concentrations of 250 mg/L or less were considered fresh. The chloride measurements used in this report were taken during the semi-annual sampling event in April, May and June 2012 and the annual event in March and April 2012. Due to mechanical issues associated with the sampling equipment, the semi-annual schedule was significantly curtailed in order to keep on schedule. The skipped wells were carefully selected based on historical consistency of chloride concentrations, while the sampled wells were selected to help identify and track known intrusion bubbles. Most recent chloride values from previous sampling events were included to complete the chloride contour maps.

Contours of **changes** in chloride concentration for the R, C, B, A, and I Zones between

Spring 2011 and Spring 2012 are shown in Appendices A-6.2, A-7.2, A-8.2, A-9.2, and A-10.2. The data set is based on available data for Spring 2012, which was then subtracted from the corresponding data for Spring 2011 (shown in A-6.3, A-7.3, A-8.3, A-9.3, and A-10.3). These contours very clearly identify the increases and decreases in chloride concentrations between these two reporting periods, and do not include the wells that were skipped due to mechanical issues.

The chloride concentration contours are similar in shape and pattern to those of the previous year. These current contours and the corresponding chloride concentration cross-section (A-11) for this reporting period indicate that intrusion of seawater across the barrier continued to be controlled west of the San Gabriel River. East of the San Gabriel River, several areas recorded elevated chloride concentrations indicating seawater intrusion. Additional areas of high chloride concentrations and/or notable changes in concentration (since the FY 2010-11 report) are as follows:

- R Zone – High chloride concentrations were present north of the west leg along Los Cerritos Channel and in the immediate vicinity of well 34L'1 on the east leg.
- C Zone – High chloride concentrations observed during the FY 2010-11 reporting period along the west leg at the Los Cerritos Channel (33ST) reduced dramatically. Chloride concentrations increased slightly around observation well 34T0.1, consistent with the elevated chloride concentrations observed during the FY 2010-11 reporting period. The continued increase in elevated chloride concentrations at observation well 34T0.1 between injection wells 34S and 34V, which have been operating steadily aside from a couple brief shutdowns (see Figure 3), demonstrates C-zone injection in that area is insufficient to control sea water intrusion.
- B Zone – West of the Los Cerritos Channel, high chloride concentrations noted during the FY 2010-11 reporting period around 33ST and to the north of the barrier's west leg (33Q9, 33T3) decreased significantly. High chloride concentrations at 33Q15 decreased slightly. Along the east leg of the barrier,

chloride concentrations at well 34JL increased dramatically even though northerly and southerly injection wells 34G2 and 34L, respectively, were operational during the entire reporting period. Monitoring well 34JL is approximately 1,600 feet between injection wells 34G2 and 34L. Chloride concentrations at 34JL demonstrates that the distance between injection wells 34G2 and 34L is too great to control seawater intrusion, even under high groundwater conditions. The plume of high chloride surrounding well 34U8 identified in the last reporting period has decreased significantly to below 250 mg/L, indicating that this plume has migrated inland. Historically, pulses of seawater have migrated through the barrier in the vicinity of 34U8. Chloride concentrations near the far southeast end of the ABP continued to decrease, particularly near 35J1 which decreased by over 600 mg/L.

- A Zone – High chloride concentrations remain and have expanded northwest of the ABP's west leg. Chloride concentrations have decreased along the west leg between the Los Cerritos Channel and San Gabriel River, especially at 33UV, 33WX, and 33Z'1. However, chloride concentrations along a majority of the barrier alignment and landward showed minimal changes or decreases in chloride concentrations, especially around the southeast end of the ABP.
- I Zone – In general, chloride concentrations remained below 250 mg/L along the west leg and northward of the barrier. The intrusion bubble between 33ST and 33UV identified in the FY 2010-11 report is not evident this reporting period, as shown by the decrease in chloride concentration of over 15,000 mg/L at well 33U'3. Though the chloride plumes/fingers along the east leg appear similar to last year's, there were notable increases in chloride concentrations on the east leg at wells 35H11 and 34LS.

There continue to be three possible causes of the high chloride concentrations in all zones north of, northwest of, and along portions of the ABP west leg (which was predominantly in steady operation during this reporting period). These include the migration of seawater inland by the Los Cerritos Channel, suspected intrusion around the west end of the barrier, and remaining seawater from previous intrusions.

North of the west leg, continued high chloride concentrations in the C zone (33S18, 33T13, 33U11) and B zone (33Q15) are likely the result of seawater intrusions from 2006 and 2007 that have not dissipated. In the A zone, the increase in chloride concentration at 33T29 is likely from the limited operation of injection wells 33T and 33S1 and downtime of 33T due to surface leakage.

This is the first time chloride change data was available for WRD and OCWD monitoring wells in the vicinity of ABP. Three wells from OCWD (OCWD-BS09A/2, OCWD-BS09A/3, and OCWD-BS09C/1) and two wells from WRD (SB1_6 and SB1_7) had chloride data that was included in the Spring 2012 chloride change contours. LACFCD is also planning eight additional observation wells which will aid in further understanding the conditions within LA County, particularly north and west of the west leg. LACFCD plans to utilize the additional data to determine whether or not to construct new injection wells to prevent seawater intrusion. OCWD is planning the installation of four multi-depth observation wells along the ABP east leg. In addition, OCWD is in the process of improving the north-south barrier alignment with the installation of 17 new clustered injection wells.

FINANCING AND COSTS

This section of the report is divided into four parts: Water Costs, Services and Supplies Costs (operation and maintenance), Fixed Assets Costs (capital outlay), and Budget. Under the terms of the 1964 Cooperative Agreement between LACFCD and OCWD, fixed assets are typically divided into facilities paid for by the LACFCD, facilities paid for by the OCWD, and joint facilities paid for by both agencies, depending on their location. Under the same agreement, water costs are divided between the LACFCD (whose portion is paid by the WRD per a separate agreement) and the OCWD. The total cost of the ABP in FY 2011-12 was $6,258,821 ($6,252,602 for injection-related operations, maintenance, water, and approved LACFCD and OCWD project expenses; $6,219 for maintenance of extraction wells).

WATER COSTS

During FY 2011-12, 4,334.7 acre-feet of water were injected at an estimated total cost of $3,883,824. The monthly water rates (dollars per AF) from July 2011 to June 2012 varied periodically as shown earlier in Table 1. The monthly quantity of water injected and total water costs paid by each agency are shown below in Table 2.

TABLE 2. QUANTITY OF WATER INJECTED AND COSTS

MONTH	AMT BY WRD (AF)	AMT BY OCWD (AF)	TOTAL AMT (AF)
Jul-11	311.4	138.8	450.2
Aug-11	304.6	67.5	372.1
Sep-11	295.6	55.4	351.0
Oct-11	291.6	47.5	339.1
Nov-11	295.3	49.9	345.2
Dec-11	161.8	52.2	214.0
Jan-12	312.5	100.5	413.0
Feb-12	192.8	82.7	275.5
Mar-12	232.5	114.9	347.4
Apr-12	256.5	173.0	429.5
May-12	215.4	130.7	346.1
Jun-12	282.7	168.9	451.6
TOTAL INJECTED	**3,152.7**	**1,182.0**	**4,334.7**
TOTAL COST ($) [From Tbl. 1]	**$ 2,817,090.68**	**$ 1,066,733.16**	**$3,883,824**

SERVICES AND SUPPLIES COSTS

As shown in Appendix A-19, a total of $2,374,997 was spent on services and supplies during the 2011-12 fiscal year (excluding liability insurance and water costs). Pursuant to the 1964 Cooperative Agreement, the OCWD pays a percentage of the applicable services and supplies costs for injection operations proportional to the percentage of the total amount of injection water paid for by the District. As a result, for this fiscal year, LACFCD was responsible for 73% of the cost for injection services and supplies while OCWD was responsible for the remaining 27%. The distribution of FY 2011-12 services and supplies costs is summarized in Table 3.

TABLE 3. DISTRIBUTION OF SERVICES AND SUPPLIES COSTS FOR INJECTION AND EXTRACTION ACTIVITIES

ITEM	LACFCD	OCWD	TOTAL
Service & Supplies of Injection Facilities (including Observation Wells)[1]	$1,638,742	$588,352	$2,227,094
Service & Supplies of Extraction Facilities[2]	$6,219	$0	$6,219
Special Programs[3]	$141,683	$0	$141,683
SUBTOTAL	**$1,786,645**	**$588,352**	**$2,374,997**
Liability Insurance	$13,350	$13,350	$26,699
TOTAL	**$1,799,995**	**$601,702**	**$2,401,696**

The values in Table 3 come from the ABP FY 2011-12 Costs (see A-19) as follows:

[1] The sum of Items 1, 2, 3, 7, 8, 9, 10, 11, 12, 14, and 15. OCWD is responsible for 27% of all costs for these items except for Item 10 (flat $375 per Agreement)

[2] The sum of Items 4, 5, and 6. OCWD is not responsible for any portion of the cost for these items.

[3] Item 13. OCWD is not responsible for any portion of the cost for this item.

The yearly cost of the services and supplies (including special programs but excluding water and extraction costs) for the last 20 years of ABP operations are shown in Table 4.

TABLE 4. COSTS OF SERVICES AND SUPPLIES FOR INJECTION

Fiscal Year	Volume of Water Injected (Ac-Ft)	Total Cost	Cost Per Ac-Ft Injected
1992-93	5,240.8	$692,864	$132.21
1993-94	4,144.8	$584,975	$141.13
1994-95	3,495.7	$651,845	$186.47
1995-96	5,269.0	$509,377	$96.67
1996-97	5,739.4	$408,064	$71.10
1997-98	5,335.8	$923,342	$173.05
1998-99	5,330.4	$795,044	$149.15
1999-00	6,077.9	$589,168	$96.94
2000-01	5,398.8	$961,649	$178.12
2001-02	6,061.7	$713,299	$117.67
2002-03	5,012.3	$1,555,921	$310.42
2003-04	5,879.7	$730,652	$124.27
2004-05	5,066.1	$918,020	$181.21
2005-06	3,457.8	$1,605,456	$464.30
2006-07	1,265.1	$2,309,300	$1,825.39
2007-08	5,971.1	$3,513,957	$588.49
2008-09	7,936.2	$1,875,902	$236.37
2009-10	5,629.2	$3,135,608	$557.03
2010-11	5,066.1	$2,830,801	$558.77
2011-12	4,334.7	$2,368,778	$546.47

[1] The higher costs per Ac-Ft injected since FY05-06 are typically because these years included costs for multiple repairs and/or capital improvement projects which were not included in previous years. The cost per Ac-ft is especially high in FY06-07 because of improvement projects, observation well cleanouts, costs related to the reclaimed water program, and various fixed costs that were incurred in a year of reduced injections due to the extended shutdowns for repairs.

The costs of the services and supplies for extraction operations for the last 20 years, including electrical costs, are shown in Table 5.

TABLE 5. COSTS OF SERVICES AND SUPPLIES FOR EXTRACTION

Fiscal Year	Volume of Water Extracted (Ac-Ft)	Total Cost	Cost Per Ac-Ft Extracted
1992-93	1,136.1	$99,099	$87.23
1993-94	992.0	$169,621	$170.99
1994-95	940.7	$148,122	$157.46
1995-96	998.4	$130,901	$131.11
1996-97	1,200.9	$51,077	$42.53
1997-98	883.5	$64,774	$73.32
1998-99	775.6	$52,043	$67.10
1999-00	679.9	$41,320	$60.77
2000-01	404.8	$49,769	$122.95
2001-02	495.0	$53,153	$107.38
2002-03	262.7	$63,165	$240.45
2003-04	0.0	$6,068	N/A
2004-05	0.0	$3,043	N/A
2005-06	0.0	$2,857	N/A
2006-07	0.0	$3,224	N/A
2007-08	0.0	$4,224	N/A
2008-09	0.0	$14,742	N/A
2009-10	0.0	$20,223	N/A
2010-11	0.0	$4,552	N/A
2011-12	0.0	$6,219	N/A

The increase in cost for FY 2008-09 and FY 2009-10 was due to increased maintenance needs at two deteriorating extraction well sites, 33V'15P and 34H'17P.

FIXED ASSETS

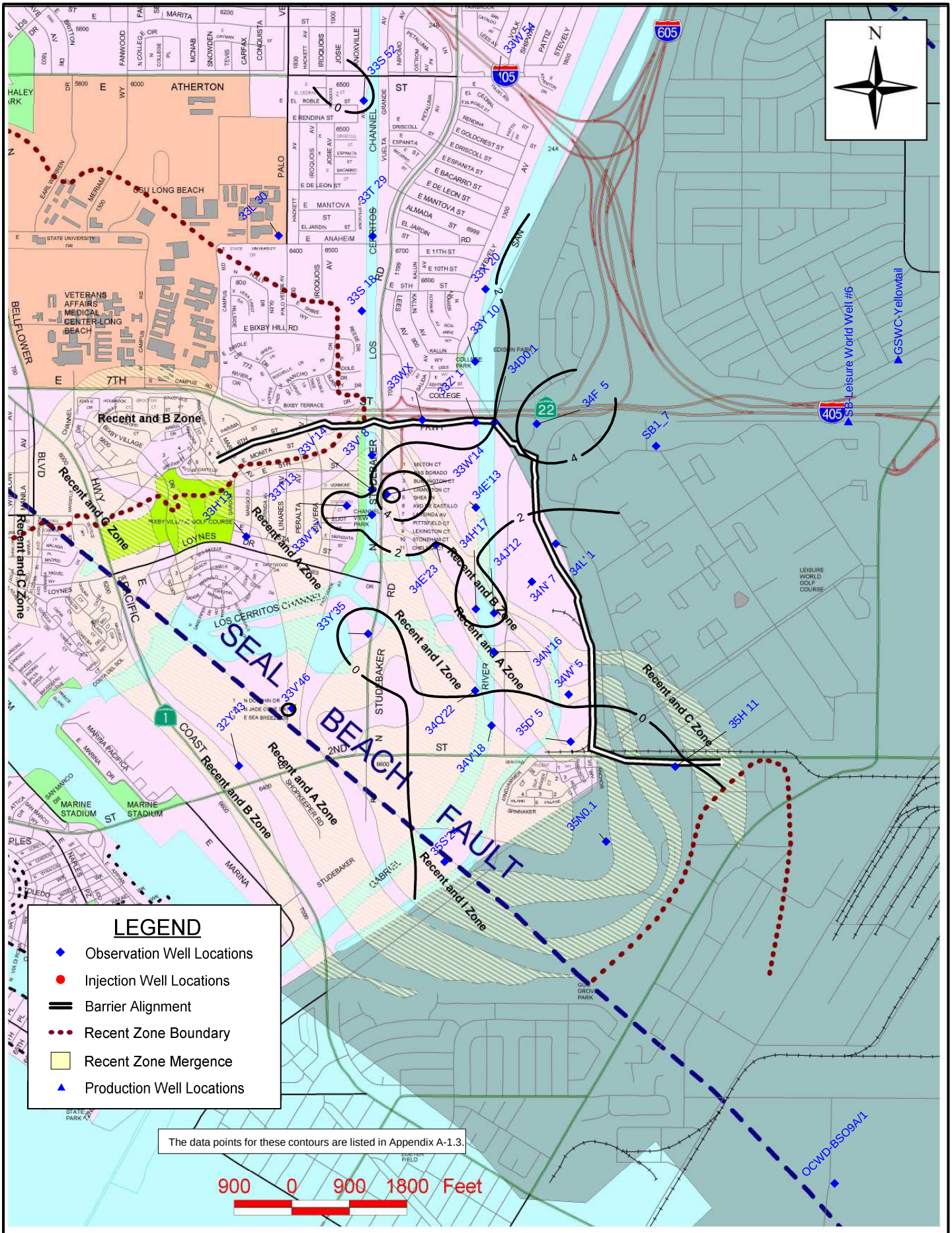
During Fiscal Year 2011-12, there were no new LACFCD facilities, OCWD facilities, or joint facilities added to the ABP. However, new OCWD facilities (Unit 14 injection and observation wells) and new LACFCD facilities (Unit 13 observation wells) are in the planning and pre-construction phases, respectively.

Public Works spent $279,454.65 on multiple capital improvement projects (including contracts and labor), primarily the ABP Condition Assessment, and the design and project management of 8 new observation wells. However, small amounts were also spent on the Injection Well assessment project and the labor expenses associated with the implementation of cathodic protection along the supply line. As agreed at the previous annual JMC meetings, the labor costs associated with these capital improvements (minus the ABP Condition Assessment contract expenses dealt with per separate agreement) were incorporated into the operation and maintenance costs (i.e., services and supplies) so that OCWD covered a portion of these costs in accordance with the distribution of water delivered (27%). Therefore, in FY 2011-12, OCWD was responsible for $50,350.10 (18%) of LACFCD's $279,454.65 expenses on capital improvement projects (see Appendix A-19).

BUDGET

The FY 2013-14 budget for the ABP is $2,769,200. A breakdown of this amount, along with past expenditures per category, is shown in Appendix A-20. Note that amounts for WRD are shown in addition to those for LACFCD and OCWD.

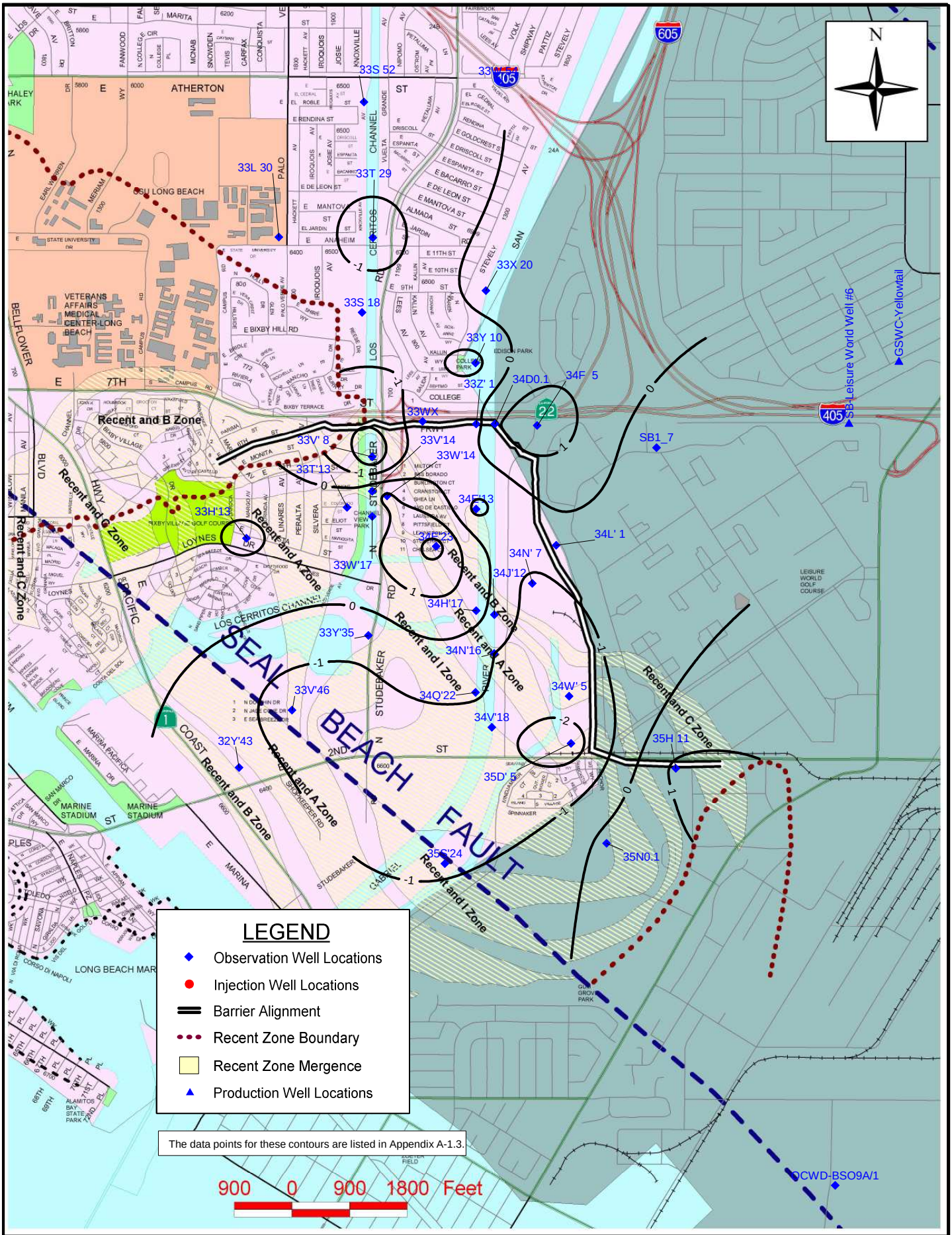
APPENDIX



Alamitos Barrier Project
R Zone Groundwater Elevation (ft) Contours Spring 2012

A-1.1

R zone GW.srf



Alamitos Barrier Project
R Zone: Change in Elevation(ft), Spring 2011 to Spring 2012

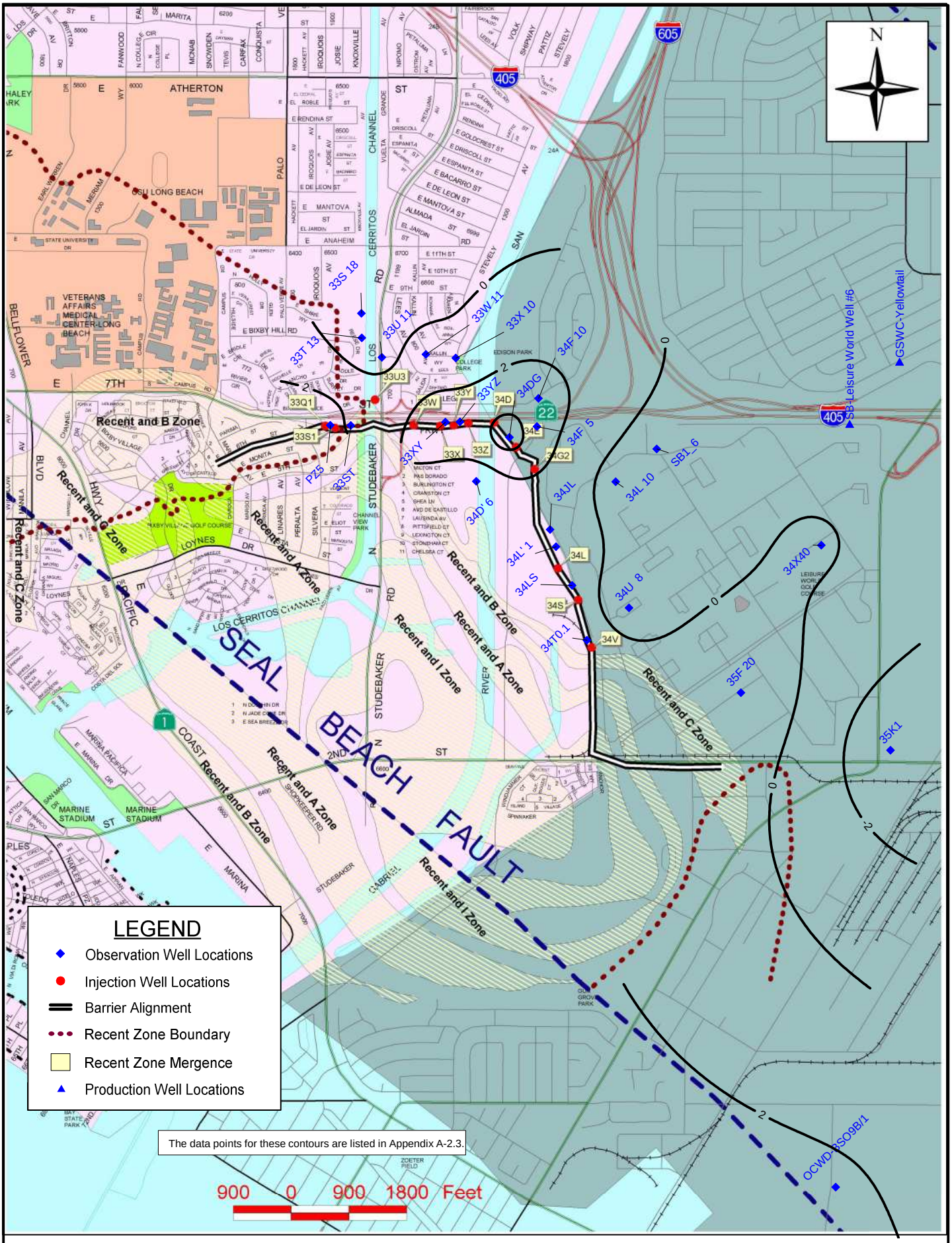
A-1.2

R zone GW.srf

ALAMITOS BARRIER PROJECT
R-Zone
Groundwater Elevation Data for Contours and Tables

POINT	PROJ	FCD	AQUIFER	DATE	FY 11-12 ELEV	P.E.[1]	Δ[2]	FY 10-11 ELEV	CHANGE IN ELEV
1	32Y'43	493WW	R	20120402	1.3			1.6	-0.3
2	33H'13	493YY	RA	20120313	1.2			0.0	1.2
3	33L 30	491G	R	20120313	0.8			1.0	-0.2
4	33S 18	492AH	R	20120328	1.4			1.8	-0.4
5	33S 52	491J	R	20120315	-0.1			0.0	-0.1
6	33T 29	491D	R	20120328	1.0			2.6	-1.6
7	33T'13	492AU	R	20110912	2.8			1.9	0.9
8	33V' 8	492BY	RA	20120329	1.1			4.0	-2.9
9	33V'14	492JJ	R	20120320	1.6			1.0	0.6
10	33V'46	493UU	R	20120403	2.1			3.8	-1.7
11	33W 54	501C	R	20120321	1.2			1.2	0.0
12	33W'14	492AT	R	20120402	7.3			6.1	1.2
13	33W'17	493PP	R	20120402	2.1			1.8	0.3
14	33WX	502AZ	R	20120402	1.0	2.0	-1.0	1.3	-0.3
15	33X 20	502L	R	20120321	1.9			1.3	0.6
16	33Y 10	502BA	R	20120321	0.5			1.8	-1.3
17	33Y'35	493AB	R	20120313	-0.9			-0.2	-0.7
18	33Z' 1	502AU	R	20120320	0.9			1.2	-0.3
19	34D0.1	502AX	R	20111006	2.0			1.1	0.9
20	34E'13	503AU	R	20120326	2.7			4.0	-1.3
21	34E'23	503X	R	20120402	1.9			-0.5	2.4
22	34F 5	502BT	R	20120417	5.9			4.0	1.9
23	34H'17	503Y	R	20120417	2.6			2.1	0.5
24	34J'12	503U	R	20120403	2.6			3.1	-0.5
25	34L' 1	503P	R	20120320	0.5			0.7	-0.2
26	34N' 7	503AE	R	20120326	0.5			1.8	-1.3
27	34N'16	503W	R	20120327	0.7			1.7	-1.0
28	34Q'22	503T	R	20120404	0.1			0.9	-0.8
29	34V'18	503V	R	20120403	-0.7			1.1	-1.8
30	34W' 5	503AH	R	20120314	0.3			1.8	-1.5
31	35D' 5	503AL	R	20120314	-0.8			1.7	-2.5
32	35H 11	514F	R	20120301	-0.1	2.0	-2.1	-1.3	1.2
33	35N0.1	504M	R	20120314	-1.9			-2.2	0.3
34	35S'24	504K	R	20120320	-0.2			0.9	-1.1
35	OCWD-BSO9A/1		R	20120312	1.8			1.8	0.0
36	SB1_7		R	20120326	3.1			3.8	-0.7
				AVG=	1.3		AVG=	1.6	

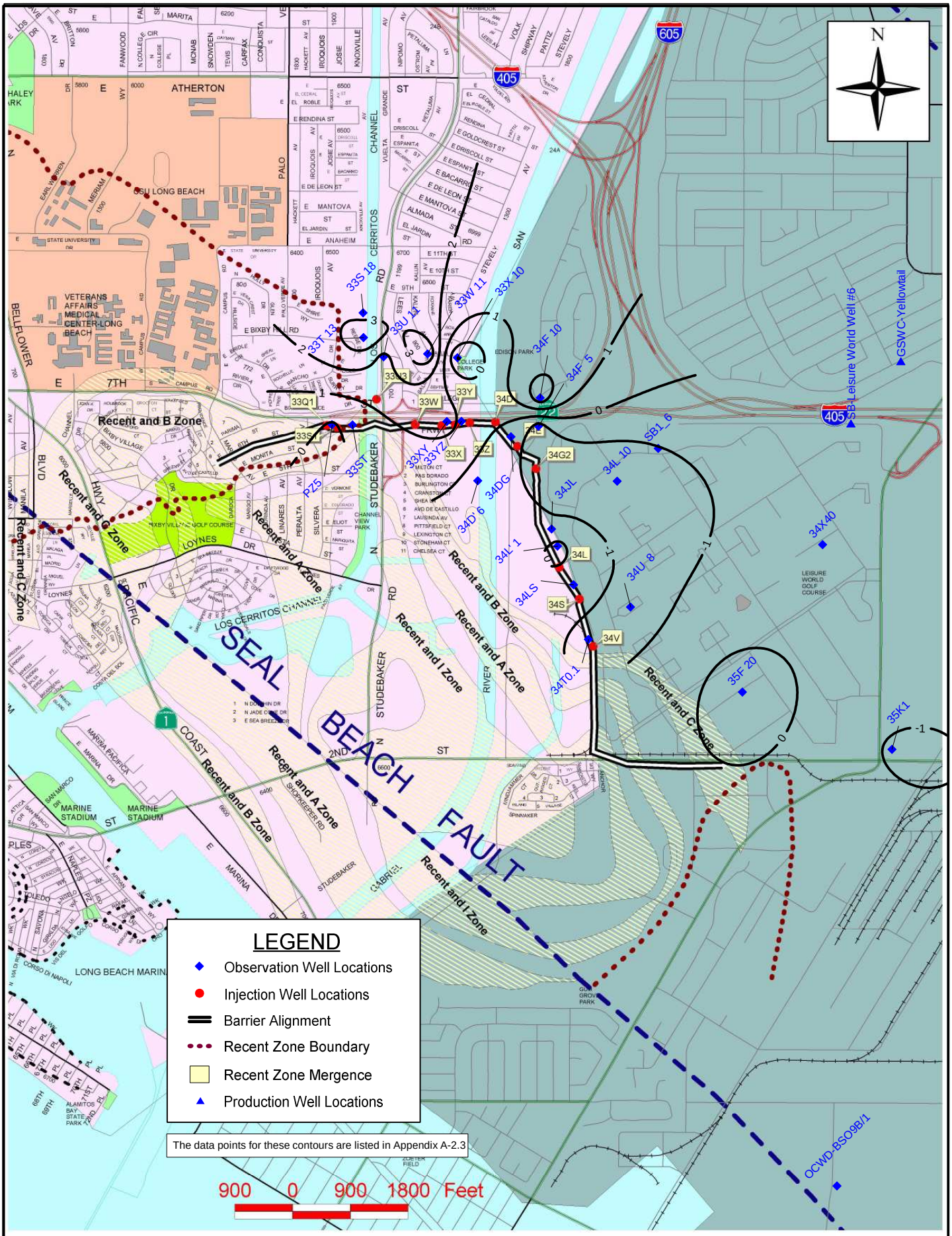
[1] P.E. represents the protective elevations calcuated for internodal wells.
[2] Δ (+/-) represents how much groundwater level is above/below respective P.E.
= A max. or min. elevation during that period.



Alamitos Barrier Project
C Zone Groundwater Elevation (ft) Contours Spring 2012

A-2.1

C zone GW.srf



Alamitos Barrier Project
C Zone: Change in Elevation (ft), Spring 2011 to Spring 2012

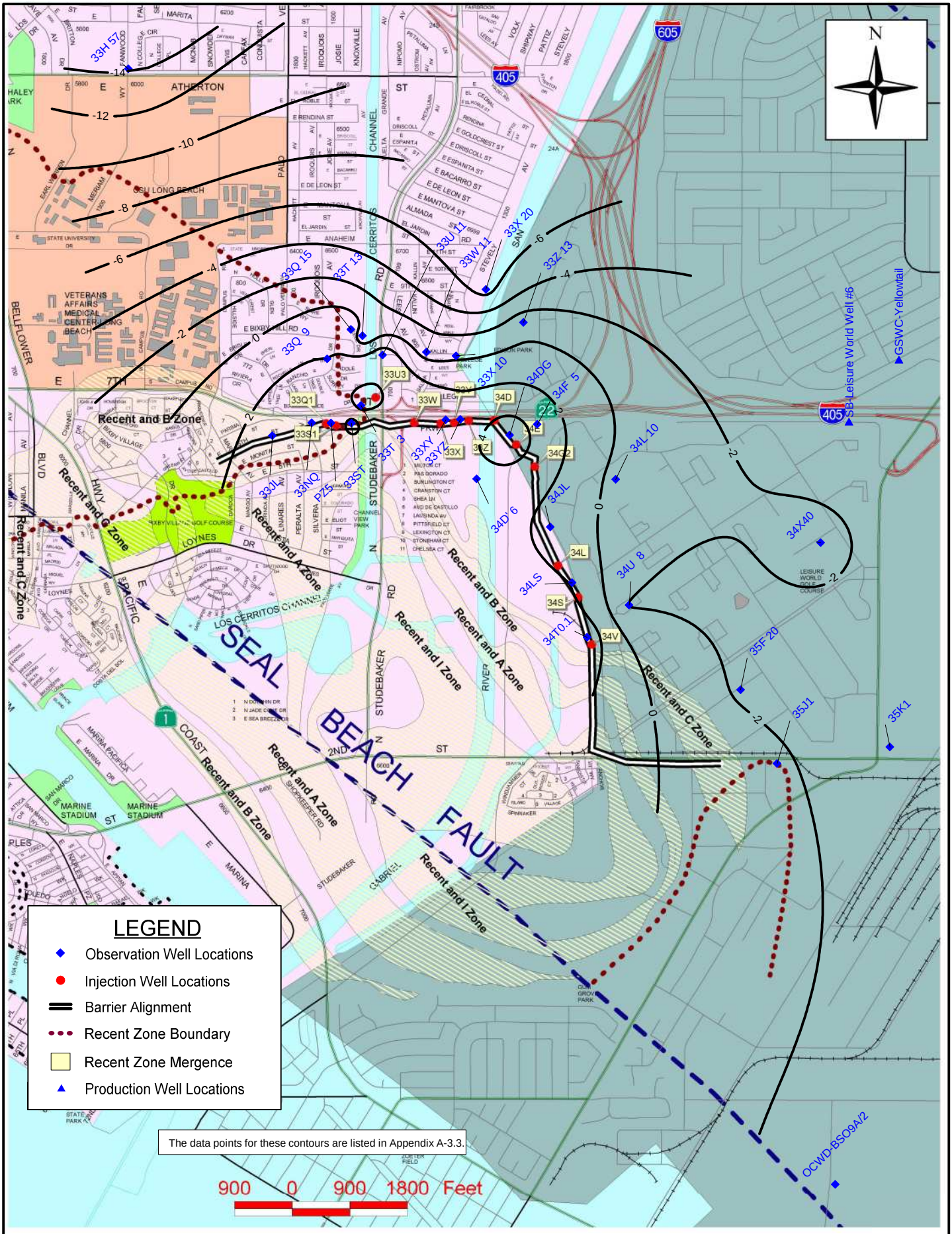
A-2.2

C zone GW.srf

ALAMITOS BARRIER PROJECT
C-Zone
Groundwater Elevation Data for Contours and Tables

POINT	PROJ	FCD	AQUIFER	DATE	FY 11-12 ELEV	P.E.[1]	Δ[2]	FY 10-11 ELEV	CHANGE IN ELEV
1	33S 18	492AG	C	20120328	-1.0			-3.6	2.6
2	33ST	492BK	CB	20120313	1.3	0.9	0.4	1.0	0.3
3	33T 13	492AC	C	20120409	-1.0			-5.0	4.0
4	33U 11	492AL	C	20120410	-0.8			-2.5	1.7
5	33W 11	502R	C	20110921	1.2			-2.7	3.9
6	33X 10	502BB	C	20120321	0.1			1.2	-1.1
7	33XY	502BL	C	20120313	3.6	5.4	-1.8	2.2	1.4
8	33YZ	502AB	C	20120314	2.9	5.4	-2.5	2.1	0.8
9	34D' 6	502BF	C	20120417	0.3			0.6	-0.3
10	34DG	502X	C	20120329	5.2	5.4	-0.2	5.7	-0.5
11	34F 5	502BU	C	20120319	2.8			4.2	-1.4
12	34F 10	502AP	C	20110928	3.3			0.7	2.6
13	34JL	503AR	C	20120320	1.0	4.2	-3.2	1.8	-0.8
14	34L' 1	503N	C	20120320	1.7	4.8	-3.1	1.4	0.3
15	34L 10	502AK	C	20120315	-0.8			1.1	-1.9
16	34LS	503BF	C	20120320	0.8	4.5	-3.7	1.2	-0.4
17	34T0.1	503AB	C	20120320	1.1	3.6	-2.5	2.4	-1.3
18	34U 8	513D	C	20120315	-1.1			0.3	-1.4
19	34X40	513R	C	20120523	0.3			0.8	-0.5
20	35F 20	513L	C	20120418	1.8			1.2	0.6
21	35K1	523D	C	20120320	-3.7	4.3	-8.0	-2.6	-1.1
22	PZ5	492CH	CB	20120402	3.8			3.9	-0.1
23	SB1_6		C	20120326	-0.7			0.3	-1.0
24	OCWD-BSO9B/1		C	20120308	2.4			2.6	-0.2
				AVG=	1.0		AVG=	0.8	

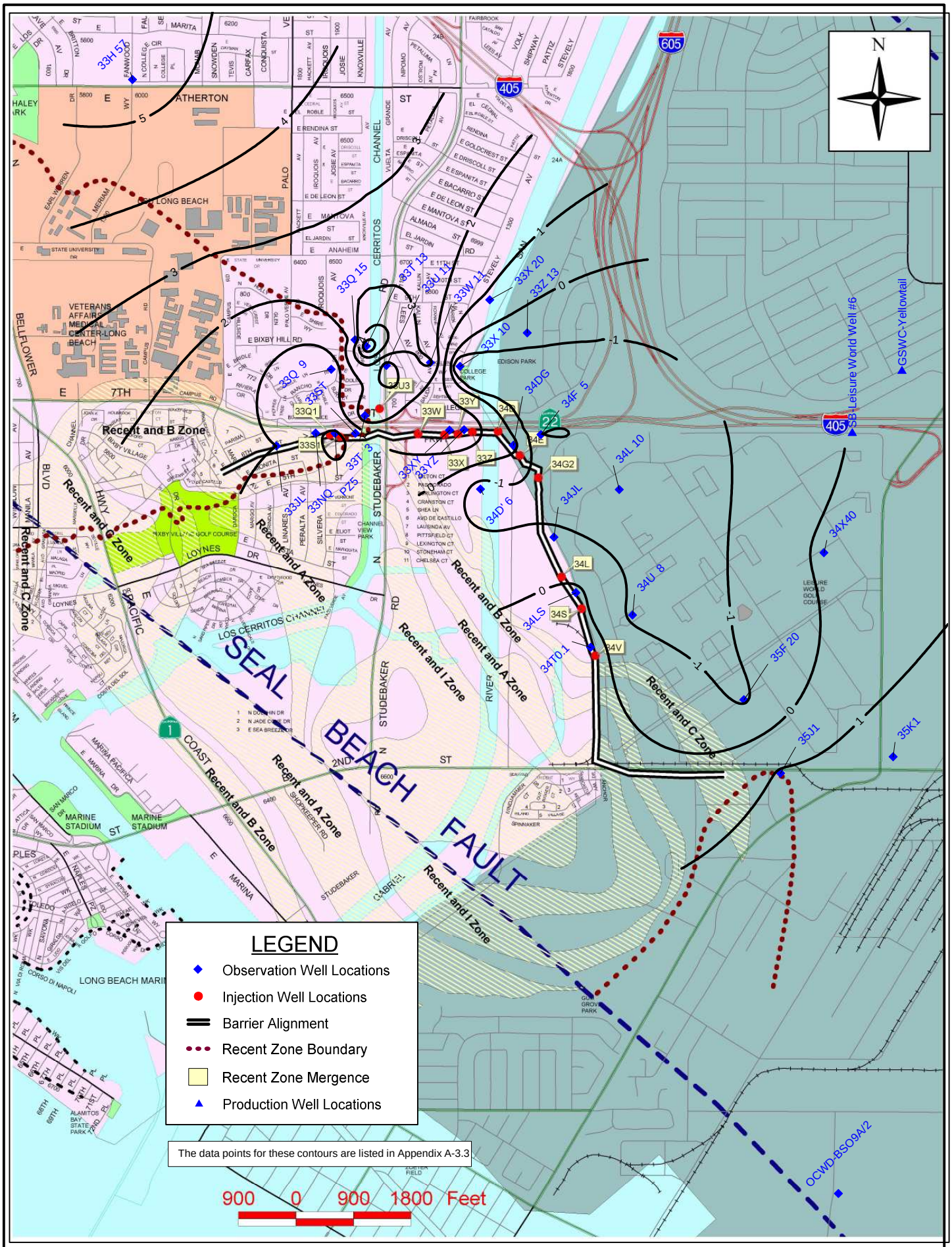
[1] P.E. represents the protective elevations calcuated for internodal wells.
[2] Δ (+/-) represents how much groundwater level is above/below respective P.E.
[ ] = A max. or min. elevation during that period.



Alamitos Barrier Project
B Zone Groundwater Elevation (ft) Contours Spring 2012

A-3.1

B zone GW.srf



Alamitos Barrier Project
B Zone: Change in Elevation (ft), Spring 2011 to Spring 2012

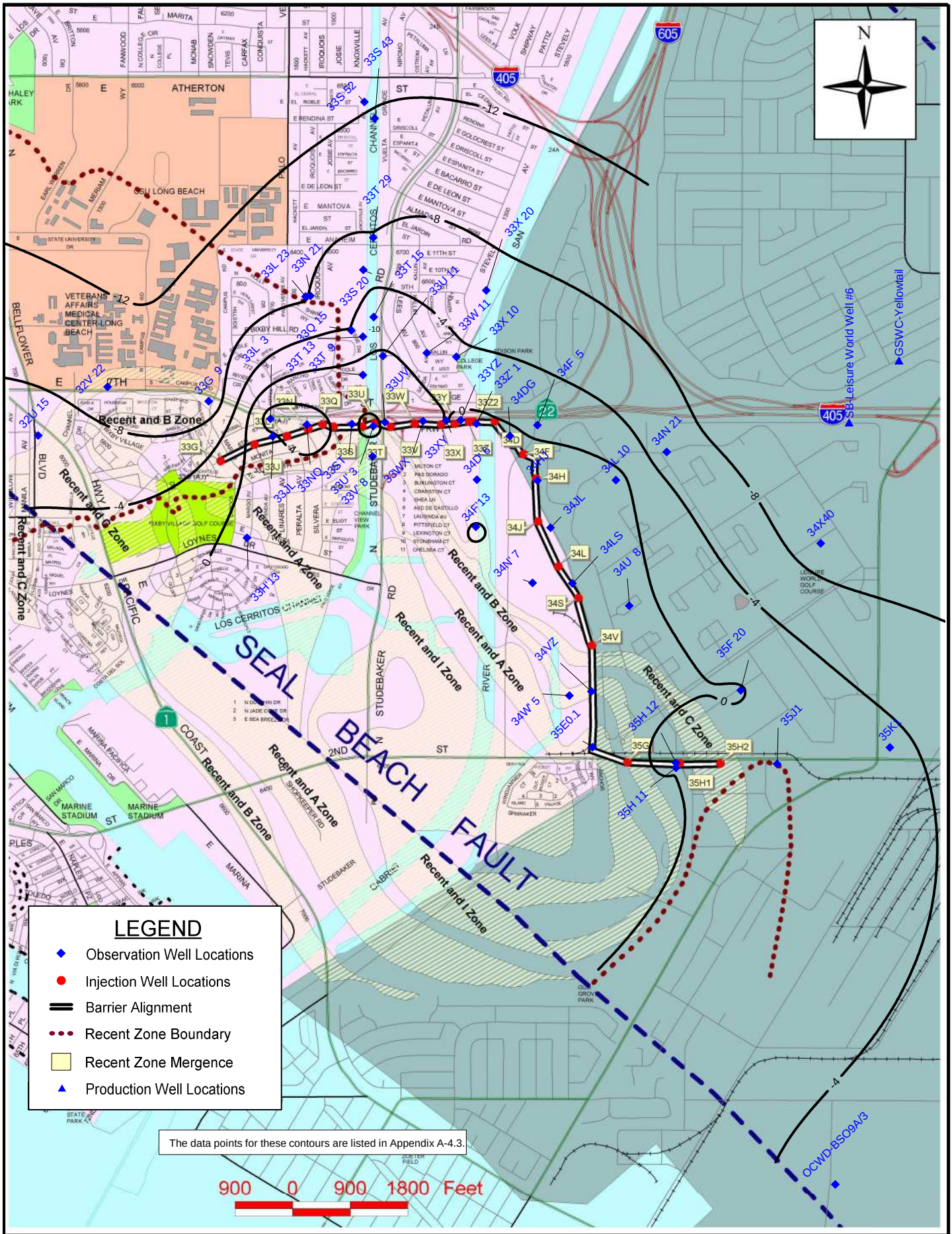
A-3.2

B zone GW.srf

ALAMITOS BARRIER PROJECT
B-Zone
Groundwater Elevation Data for Contours and Tables

POINT	PROJ	FCD	AQUIFER	DATE	FY 11-12 ELEV	P.E.[1]	Δ[2]	FY 10-11 ELEV	CHANGE IN ELEV
1	33H 57	481	B	20120326	-14.0			-19.5	5.5
2	33JL	492BQ	B	20120313	2.8	0.9	1.9	1.8	1.0
3	33NQ	492BN	B	20120313	3.8	0.7	3.1	3.7	0.1
4	33Q 9	492CM	B	20120319	2.0			1.7	0.3
5	33Q 15	492AN	B	20120328	2.0			-0.3	2.3
6	33ST	492BK	CB	20120313	1.3	0.9	0.4	1.0	0.3
7	33T 3	492CL	B	20120319	4.6			2.0	2.6
8	33T 13	492AB	B	20120409	-1.7			-7.8	6.1
9	33U 11	492AK	B	20120410	3.5			2.0	1.5
10	33W 11	502S	B	20120410	-0.8			-4.0	3.2
11	33X 10	502BC	B	20120326	-0.3			1.2	-1.5
12	33X 20	502K	B	20120321	-6.7			-7.5	0.8
13	33XY	502BM	B	20120313	3.8	6.3	-2.5	2.1	1.7
14	33YZ	502AC	B	20120314	2.7	7.1	-4.4	0.8	1.9
15	33Z 13	502E	B	20120327	-0.8			-0.2	-0.6
16	34D' 6	502BG	B	20120314	3.3			4.8	-1.5
17	34DG	502Y	B	20120329	5.4	6.6	-1.2	5.1	0.3
18	34F 5	502BS	B	20120319	3.3			5.3	-2.0
19	34JL	503AQ	B	20120320	1.2	5.3	-4.1	2.0	-0.8
20	34L 10	502AL	B	20120315	-0.5			1.3	-1.8
21	34LS	503BE	B	20120328	1.9	5.4	-3.5	1.7	0.2
22	34T0.1	503AC	B	20120320	3.2	6.1	-2.9	2.8	0.4
23	34U 8	513E	B	20120315	-2.1			-0.9	-1.2
24	34X40	513Q	B	20120523	-1.6			-1.8	0.2
25	35F 20	513K	B	20120315	-2.2			-1.1	-1.1
26	35J1	514M	B	20120320	-1.8	5.8	-7.6	-2.9	1.1
27	35K1	523A	B	20120320	-2.8	5.8	-8.6	-4.4	1.6
28	PZ5	492CH	CB	20120402	3.8			3.9	-0.1
29	OCWD-BSO9A/2		B	20120308	-2.8			-4.5	1.8
				AVG=	0.4		AVG=	-0.4	

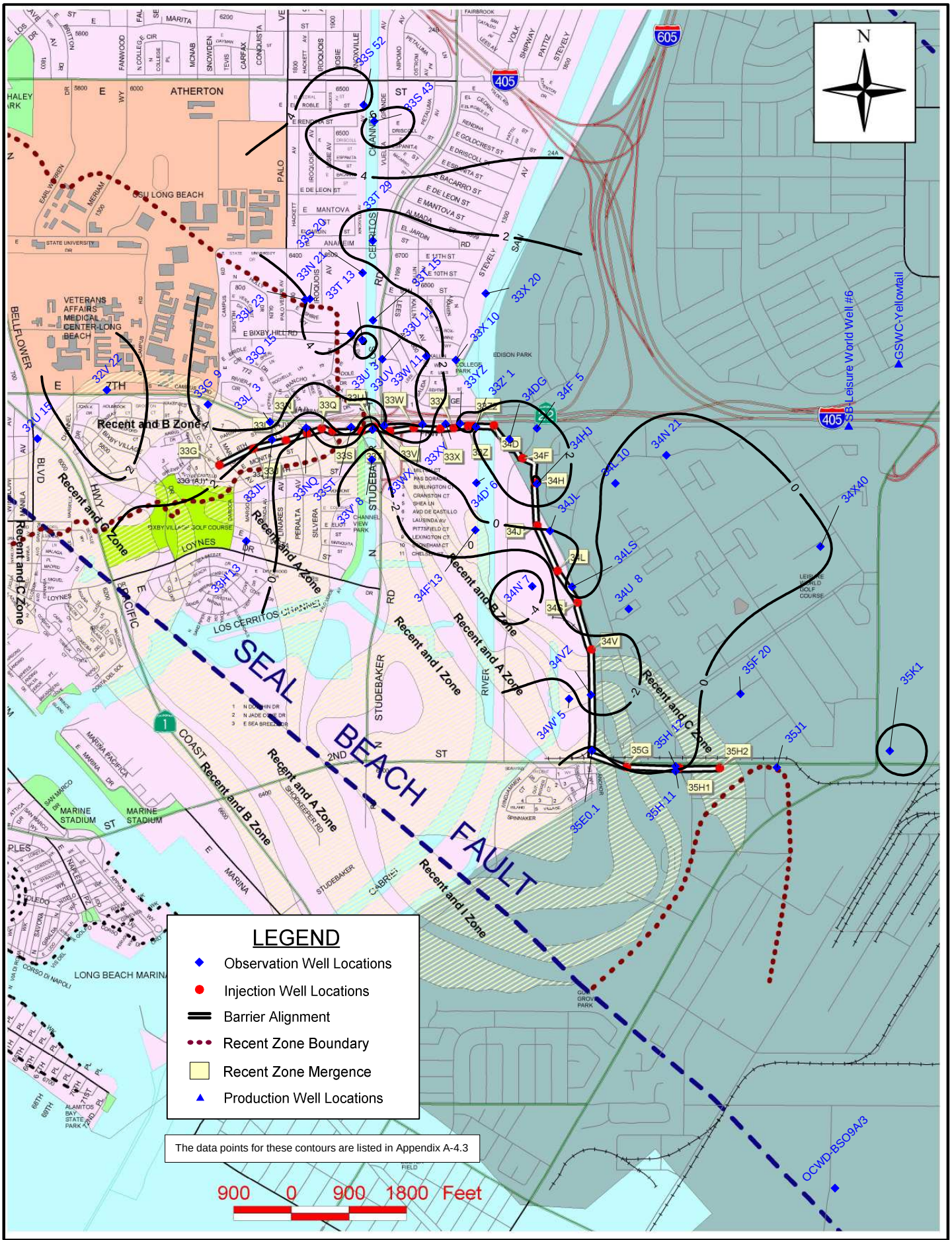
[1] P.E. represents the protective elevations calcuated for internodal wells.
[2] Δ (+/-) represents how much groundwater level is above/below respective P.E.
[ ] = A max. or min. elevation during that period.



Alamitos Barrier Project
A Zone Groundwater Elevation (ft) Contours Spring 2012

A-4.1

A zone GW.srf



Alamitos Barrier Project
A Zone: Change in Elevation (ft), Spring 2011 to Spring 2012

A-4.2

A zone GW.srf

ALAMITOS BARRIER PROJECT
A-Zone
Groundwater Elevation Data for Contours and Tables

POINT	PROJ	FCD	AQUIFER	DATE	FY 11-12 ELEV	P.E.[1]	Δ[2]	FY 10-11 ELEV	CHANGE IN ELEV
1	32U 15	482M	A	20120403	-5.3			-8.3	3.0
2	32V 22	482P	A	20120319	-10.1			-10.1	0.0
3	33G 9	482F	A	20120313	-11.2			-16.1	4.9
4	33H'13	493YY	RA	20120313	1.2			0.0	1.2
5	33JL	492BW	AI	20120313	3.4	3.1	0.3	2.6	0.8
6	33L 3	492	A	20120319	6.2			0.6	5.6
7	33L 23	492RR	A	20120328	-8.4			-13.0	4.6
8	33N 21	492BU	A	20120313	-7.6			-10.1	2.5
9	33NQ	492BP	AI	20120313	5.2	3.6	1.6	5.5	-0.3
10	33Q 15	492AM	A	20120328	-3.9			-5.9	2.0
11	33S 20	492BR	A	20120313	-4.4			-7.4	3.0
12	33S 43	491E	A	20120328	-9.9			-17.7	7.8
13	33S 52	491H	A	20120315	-14.1			-17.1	3.0
14	33ST	492BL	A	20120313	3.3	2.8	-1.7	-0.5	3.8
15	33T 9	492TT	A	20120409	1.1				n/a
16	33T 13	492ZZ	A	20120409	-1.4			-10.2	8.8
17	33T 15	492SS	A	20120314	-2.7			-5.3	2.6
18	33T 29	491C	A	20120328	-7.8			-7.9	0.1
19	33U 11	492AJ	A	20120410	0.5			-3.7	4.2
20	33U' 3	492WW	A	20120329	5.9			8.3	-2.4
21	33UV	492BH	A	20120314	2.6	4.0	-1.4	-1.4	4.0
22	33V' 8	492BY	RA	20120329	1.1			4.0	-2.9
23	33W 11	502T	A	20120410	-1.7			-6.1	4.4
24	33WX	502AF	A	20120313	1.3	7.6	-6.3	-2.9	4.2
25	33X 10	502BD	A	20120326	-3.4			-3.4	0.0
26	33X 20	502J	A	20120321	-6.7			-7.5	0.8
27	33XY	502BN	A	20120313	-0.1	8.0	-8.1	0.3	-0.4
28	33YZ	502AD	A	20120314	0.6	8.7	-8.1	-2.0	2.6
29	33Z' 1	502G	A	20120320	0.8			-1.1	1.9
30	34D' 6	502BH	A	20120321	0.1			-0.4	0.5
31	34DG	502Z	A	20120315	0.8	8.5	-7.7	-3.3	4.1
32	34F 5	502BR	A	20120319	-1.3			-3.7	2.4
33	34F'13	503Q	A	20120320	4.3			4.6	-0.3
34	34HJ	502BX	A	20120315	3.0	8.6	-5.6	-1.2	4.2
35	34JL	503AP	A	20120320	3.3	7.8	-4.5	3.4	-0.1
36	34L 10	502AM	A	20120315	1.3			2.1	-0.8
37	34LS	503BD	A	20120320	2.7	7.7	-5.0	1.7	1.0
38	34N 21	512B	A	20120315	-6.3			-5.6	-0.7
39	34N' 7	503AF	A	20120326	1.6			7.4	-5.8

ALAMITOS BARRIER PROJECT

A-Zone

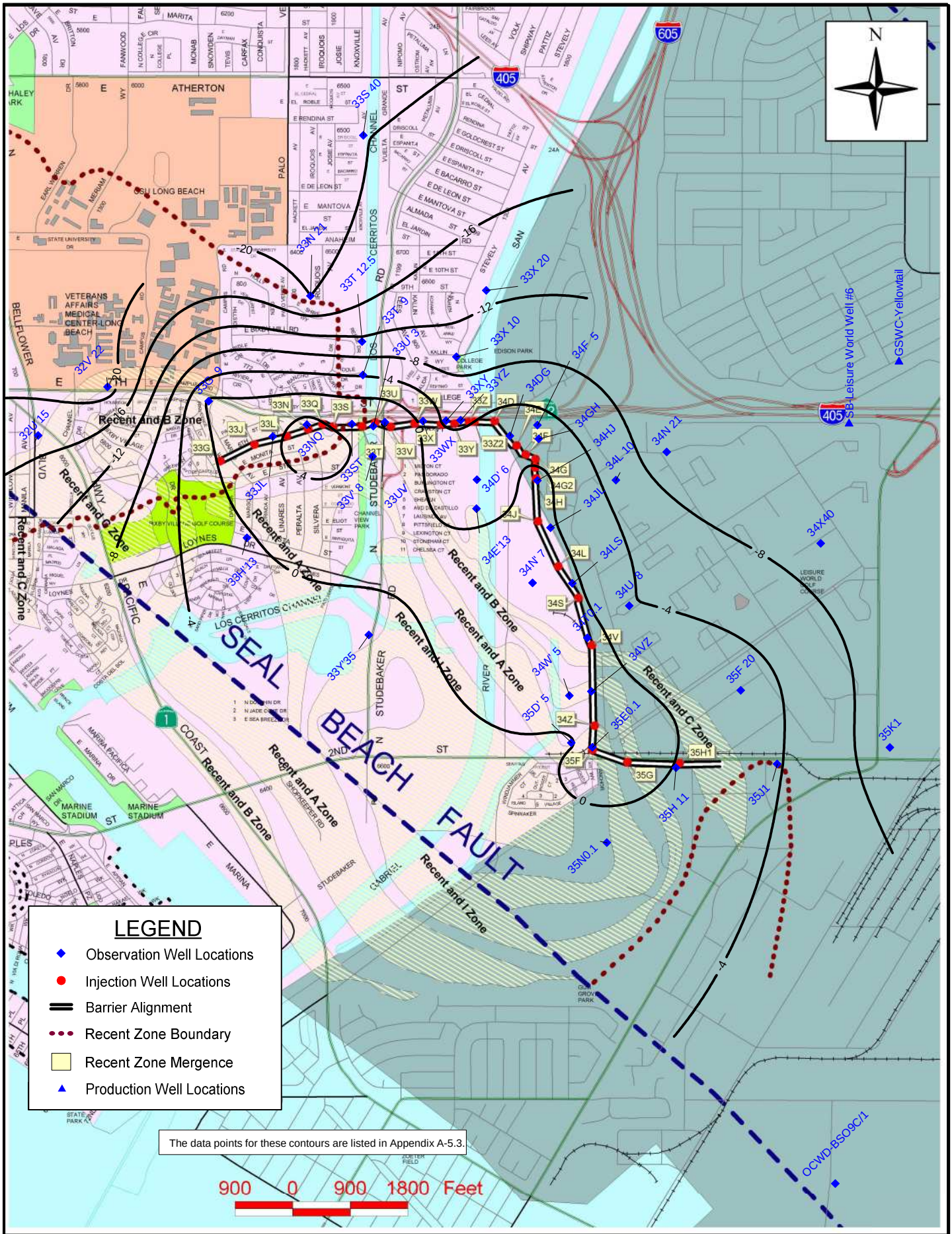
Groundwater Elevation Data for Contours and Tables

POINT	PROJ	FCD	AQUIFER	DATE	FY 11-12 ELEV	P.E.[1]	Δ[2]	FY 10-11 ELEV	CHANGE IN ELEV
40	34U 8	513F	A	20120315	0.9			2.7	-1.8
41	34VZ	503BH	A	20120403	3.1	4.4	-1.3	6.7	-3.6
42	34W' 5	503AJ	A	20120314	1.5			2.6	-1.1
43	34X40	513P	A	20120523	-10.0			-9.9	-0.1
44	35E0.1	503BK	A	20120403	2.5	2.4	0.1	2.3	0.2
45	35F 20	513J	A	20120315	0.2			-1.2	1.4
46	35H 11	514G	A	20120320	-0.1	3.8	-3.9	-0.5	0.4
47	35H 12	514D	A	20120301	-2.1	3.8	-5.9	-1.5	-0.6
48	35J1	514L	A	20120320	-1.0			-2.4	1.4
49	35K1	523B	A	20120320	-3.2	6.2	-9.4	-3.0	-0.2
50	OCWD-BSO9A/3		A	20120308	-5.1			-5.6	0.5
				AVG=	-1.4		AVG=	-2.9	

[1] P.E. represents the protective elevations calcuated for internodal wells.

[2] Δ (+/-) represents how much groundwater level is above/below respective P.E.

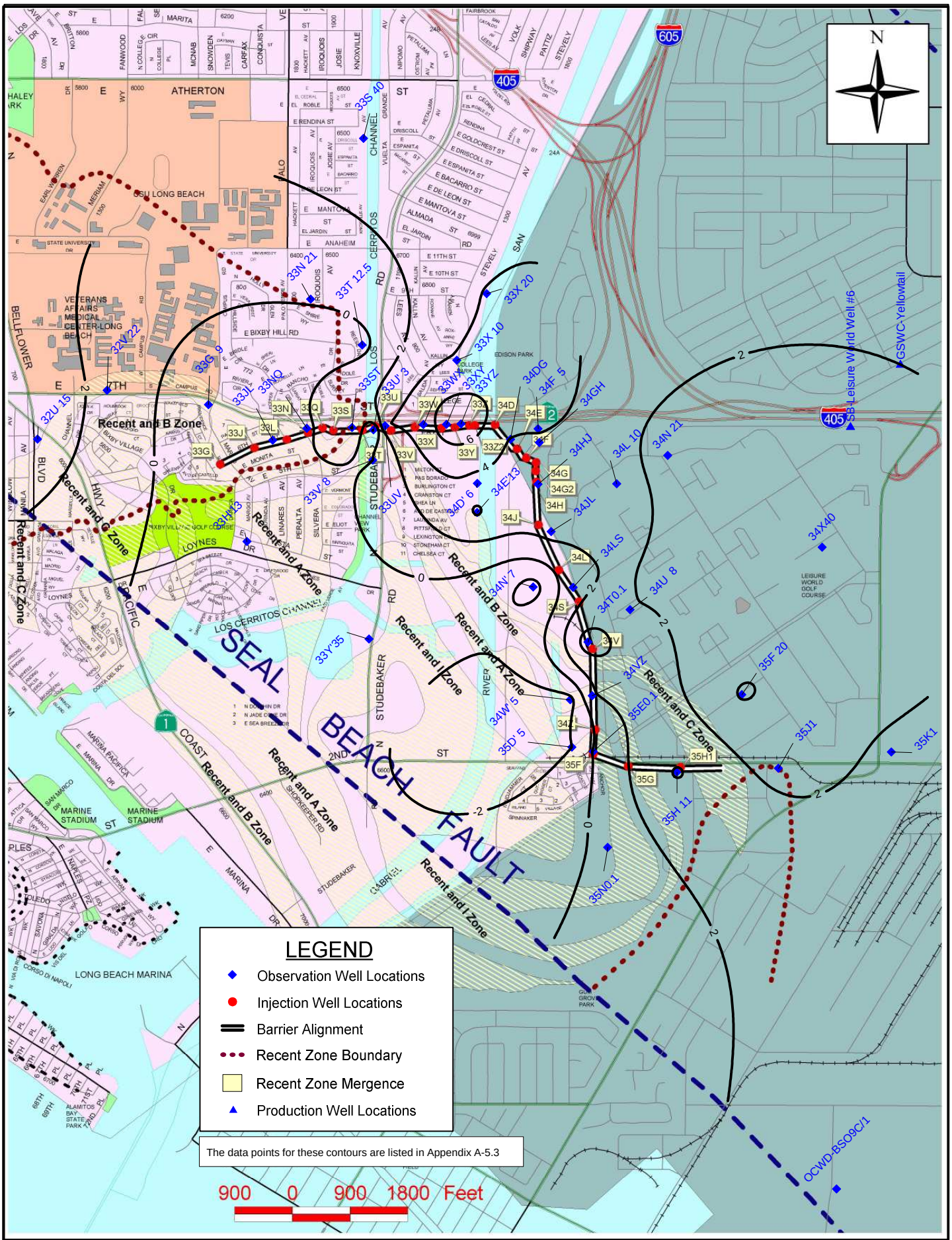
[ ] = A max. or min. elevation during that period.



Alamitos Barrier Project
I Zone Groundwater Elevation (ft) Contours Spring 2012

A-5.1

I zone GW.srf



Alamitos Barrier Project
I Zone: Change in Elevation (ft), Spring 2011 to Spring 2012

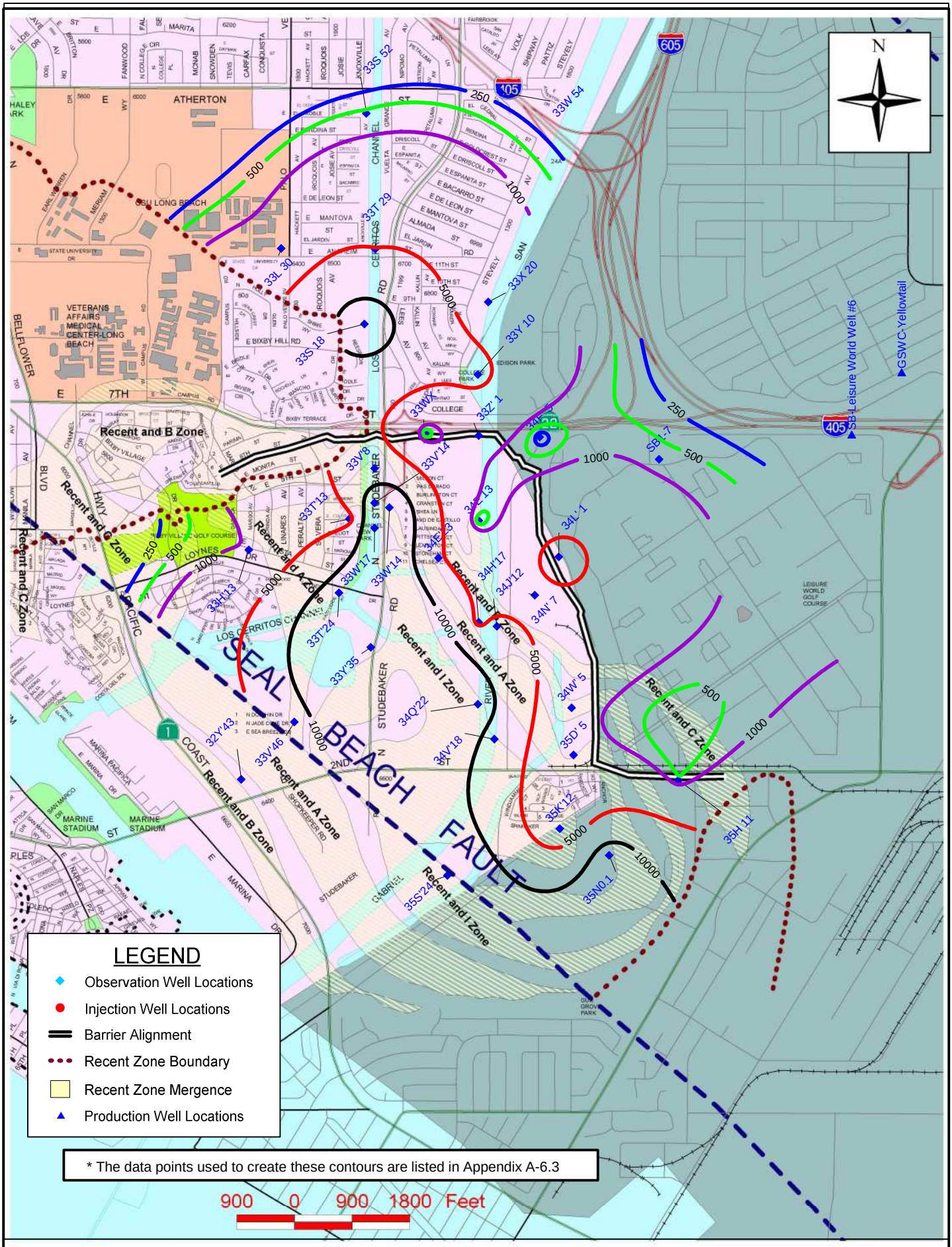
A-5.2

I zone GW.srf

ALAMITOS BARRIER PROJECT
I-Zone
Groundwater Elevation Data for Contours and Tables

POINT	PROJ	FCD	AQUIFER	DATE	FY 11-12 ELEV	P.E.[1]	Δ[2]	FY 10-11 ELEV	CHANGE IN ELEV
1	32U 15	482L	I	20120403	-17.2			-20.2	3.0
2	32V 22	482N	I	20120319	-21.8			-23.4	1.6
3	33G 9	482G	I	20120313	0.5			2.1	-1.6
4	33H'13	493XX	I	20120313	-0.4			0.9	-1.3
5	33JL	492BW	AI	20120313	3.4	3.1	0.3	3.4	0.0
6	33N 21	492BV	I	20120313	-20.0			-20.1	0.1
7	33NQ	492BP	AI	20120313	5.2			5.5	-0.3
8	33S 40	491F	I	20120314	-20.1			-23.3	3.2
9	33ST	492BM	I	20120313	3.1	4.2	-1.1	1.0	2.1
10	33T 12.5	492BT	I	20120320	-11.3			-10.8	-0.5
11	33U' 3	492QQ	I	20120329	3.4			5.6	-2.2
12	33UV	492BJ	I	20120314	4.2	6.1		0.3	3.9
13	33V' 8	492BX	I	20120329	3.2			3.2	0.0
14	33WX	502AG	I	20120313	-0.6	10.4	-11.0	-5.4	4.8
15	33X 10	502BE	I	20120321	-10.2			-14.4	4.2
16	33X 20	502H	I	20120321	-12.7			-16.8	4.1
17	33XY	502BP	I	20120313	-4.9	11.0		-12.1	7.2
18	33Y'35	493ZZ	I	20120313	-1.7			-0.7	-1.0
19	33YZ	502AE	I	20120314	-4.5	11.1		-12.0	7.5
20	34D' 6	502BI	I	20120321	-3.8			-7.2	3.4
21	34DG	502AA	I	20120315	-0.5	4.0	-4.5	-4.4	3.9
22	34E'13	503AT	I	20120313	-1.0			-5.2	4.2
23	34F 5	502BQ	I	20120319	-2.4			-7.2	4.8
24	34GH	502BV	I	20120301	-1.8	11.3		-4.0	2.2
25	34HJ	502BW	I	20120315	1.0	11.0	-10.0	-2.3	3.3
26	34JL	503AN	I	20120320	0.3	10.4		-2.3	2.6
27	34L 10	502AN	I	20120315	-5.4			-8.7	3.3
28	34LS	503BC	I	20120320	0.6	9.5	-8.9	-0.6	1.2
29	34N 21	512C	I	20120315	-10.2			-11.0	0.8
30	34N' 7	503AG	I	20120326	2.7			5.5	-2.8
31	34T0.1	503AD	I	20120320	1.7	8.4	-6.7	-3.4	5.1
32	34U 8	513G	I	20120315	-3.8			-5.9	2.1
33	34VZ	503BG	I	20120319	0.8	5.9	-5.1	-0.9	1.7
34	34W' 5	503AK	I	20120314	1.0			3.6	-2.6
35	34X40	513N	I	20120523	-9.6			-10.8	1.2
36	35D' 5	503AM	I	20120314	-0.3			1.7	-2.0
37	35E0.1	503BJ	I	20120403	2.5	3.0	-0.5	2.4	0.1
38	35F 20	513H	I	20120315	-1.5			-1.3	-0.2
39	35H 11	514H	I	20120301	-0.1	5.5	-5.6	-4.3	4.2
40	35J1	513M	I	20120320	-3.7			-5.3	1.6
41	35K1	523C	I	20120320	-10.0			-12.3	2.3
42	35N0.1	504N	I	20120314	-1.2			-1.7	0.5
43	OCWD-BSO9C/1		I	20120308	-6.3			-9.0	2.7
				AVG=	-3.6		AVG=	-5.4	

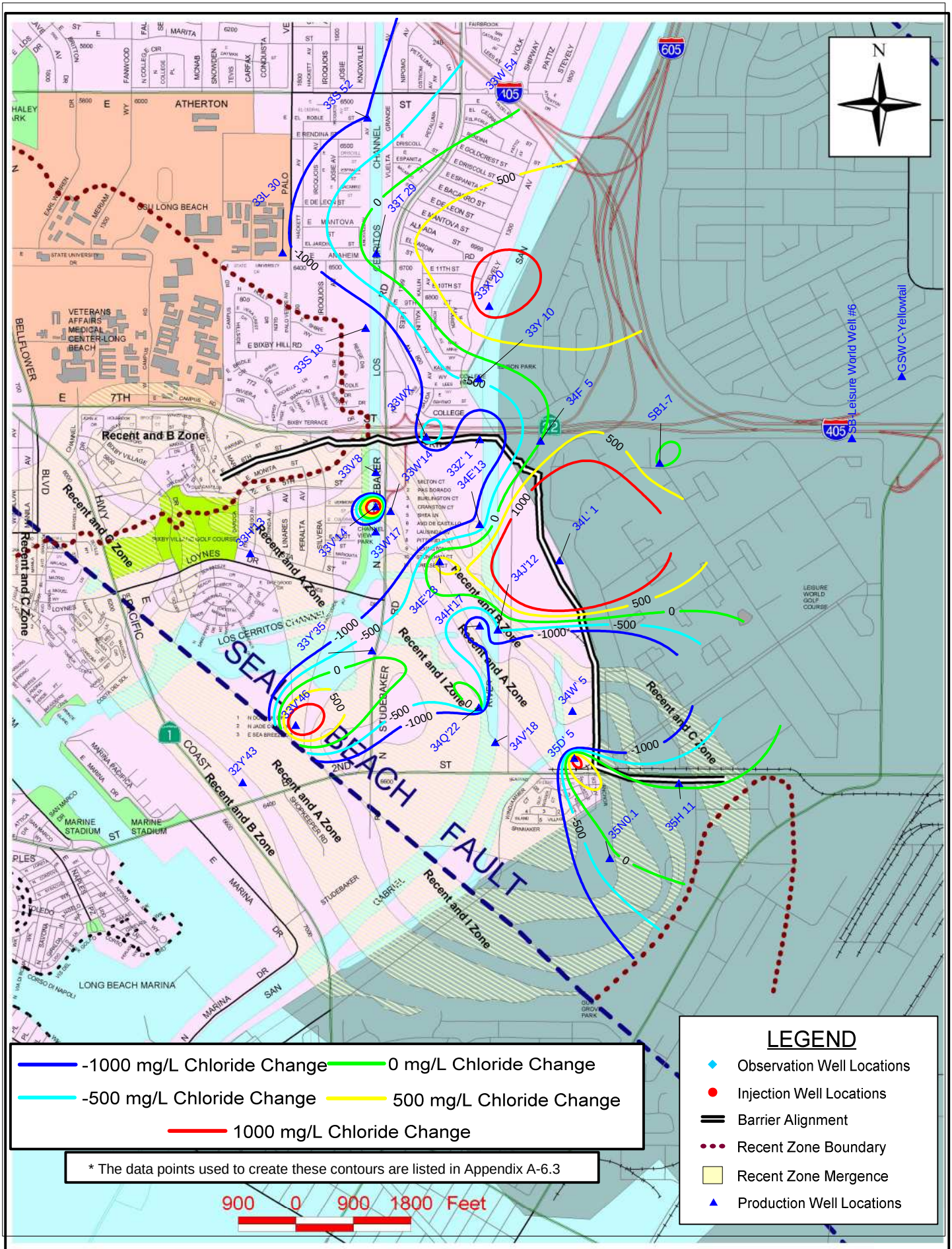
[1] P.E. represents the protective elevations calcuated for internodal wells.
[2] Δ (+/-) represents how much groundwater level is above/below respective P.E.
[ ] = A max. or min. elevation during that period.



Alamitos Barrier Project
R Zone Chloride Concentration (mg/L) Contours: Spring 2012

A-6.1

R zone CL.srf



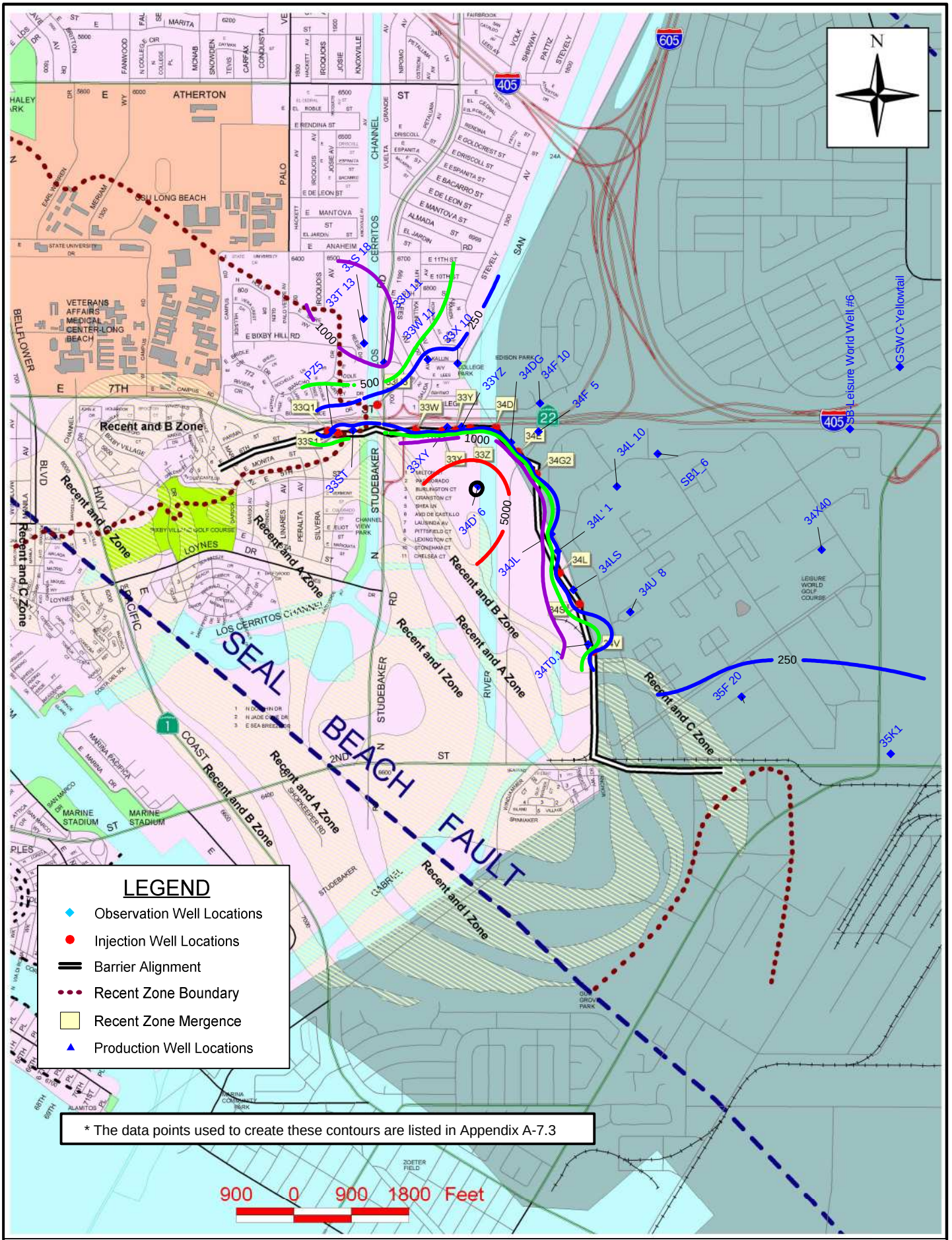
Alamitos Barrier Project
R Zone: Change in Chloride Concentration, Spring 2011 to Spring 2012

A-6.2

R zone CL.srf

ALAMITOS BARRIER PROJECT
R-ZONE CHLORIDE CONCENTRATIONS
Chloride Data Used for Contours and Cross-Section

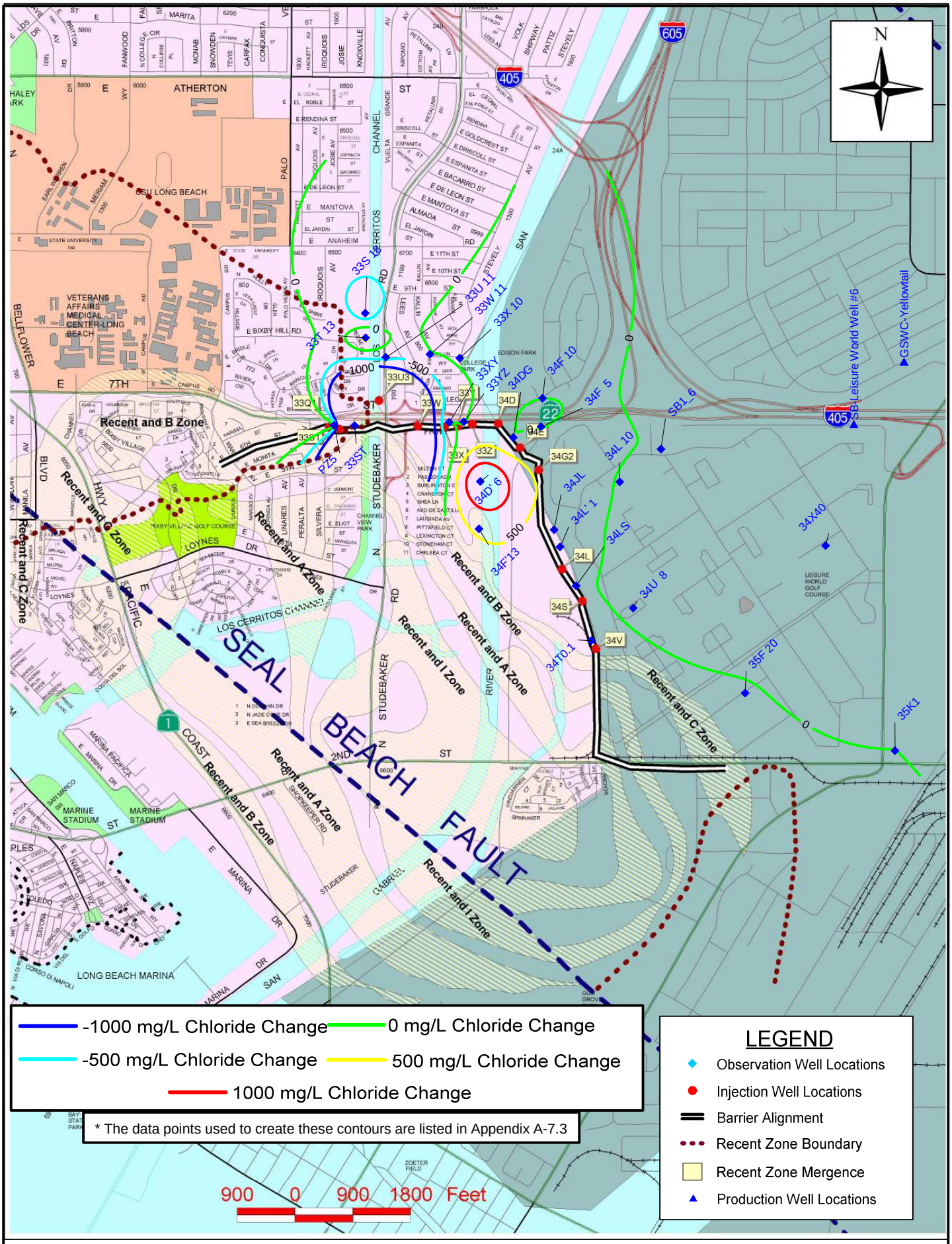
No.	PROJ	FCD	DATE	AQUIFER	For Cross-Section (Internodal Wells in **Bold**)						For Contours	MAX CHLORIDE 10-11	Change in Chloride (FY11-12 - FY10-11)
					ELEV 1 (ft)	CHL 1 (mg/L)	ELEV 2 (ft)	CHL 2 (mg/L)	ELEV 3 (ft)	CHL 3 (mg/L)	MAX CHL. 11-12		
1	32Y'43	493WW	20120402	R	-43	1,900					1,900	9,300	-7,400
2	33H'13	493YY	20120313	(R,A)	-18	504	-38	840	-58	1,160	1,160	9,550	-8,390
3	33L 30	491G	20120313	R	-50	1,880					1,880	3,000	-1,120
4	33S 18	492AH	20120328	R	-67	13,000					13,000	14,700	-1,700
5	33S 52	491J	20120315	R	-54	559					559	1,550	-991
6	33T 29	491D	20120328	R	-56	5,090					5,090	4,800	290
7	33T'13	492AU	20110302	R	-41	3,750	-51	3,450			3,750	3,750	N/A
8	33T'24	493SS	20110217	R	-17	12,300					12,300	12,300	N/A
9	33V'8	492BY	20120329	(R,A)	-24	7,560	-48	6,690			7,560	14,300	-6,740
10	33V'14	492JJ	20120320	R	-67	13,300					13,300	10,300	3,000
11	33V'46	493UU	20120403	R	-61	7,570					7,570	5,700	1,870
12	33W 54	501C	20120321	R	-33	127	-53	122			127	320	-193
13	33W'14	492AT	20120402	R	-46	7,850	-66	14,100			14,100	17,800	-3,700
14	33W'17	493PP	20120402	R	-41	11,100	-51	14,600			14,600	17,050	-2,450
15	**33WX**	**502AZ**	**20120522**	**R**	**-45**	**73**					**73**	**75**	**-2**
16	33X 20	502L	20110921	R	-68	2,150					2,150	900	1,250
17	33Y 10	502BA	20120321	R	-58	1,110	-83	6,230			6,230	6,700	-470
18	33Y'35	493AB	20120313	R	-36	23,500					23,500	23,600	-100
19	**33Z' 1**	**502AU**	**20111005**	**R**	**-46**	**1,700**	**-56**	**900**			**1,700**	**3,600**	**-1,900**
20	34E'13	503AU	20120326	R	-19	176	-52	207			207	1,050	-843
21	34E'23	503X	20120402	R	-43	5,530					5,530	4,800	730
22	34F 5	502BT	20110926	R	-136	80	-146	65	-156	60	80	80	0
23	34H'17	503Y	20120327	R	-46	4,410					4,410	5,950	-1,540
24	34J'12	503U	20120403	R	-28	5,920	-36	6,070			6,070	6,550	-480
25	**34L' 1**	**503P**	**20110927**	**R**	**-57**	**6,750**					**6,750**	**950**	**5,800**
26	34N' 7	503AE	20110228	R	-51	1,050	-61	1,700	-70	3,850	3,850	3,850	N/A
27	34Q'22	503T	20120404	R	-42	10,800	-57	12,700			12,700	12,300	400
28	34V'18	503V	20120403	R	-48	8,250					8,250	17,800	-9,550
29	34W' 5	503AH	20120314	R	-51	1,630					1,630	11,000	-9,370
30	35D' 5	503AL	20120314	R	-57	1,930					1,930	550	1,380
31	**35H 11**	**514F**	**20120521**	**R**	**-42**	**459**	**-65**	**550**			**550**	**600**	**-50**
32	35K'12	504R	20110307	R	-44	1,200	-54	750			1,200	1,200	N/A
33	35N0.1	504M	20120314	R	-38	12,500	-62	12,700			12,700	12,800	-100
34	35S'24	504K	20110307	R	-14	14,450					14,450	14,450	N/A
35	SB1-7		20120516	R	n/a	690					690	760	-70



Alamitos Barrier Project
C Zone Chloride Concentration (mg/L) Contours: Spring 2012

A-7.1

C zone CL.srf



Alamitos Barrier Project
C Zone: Change in Chloride Concentration, Spring 2011 to Spring 2012

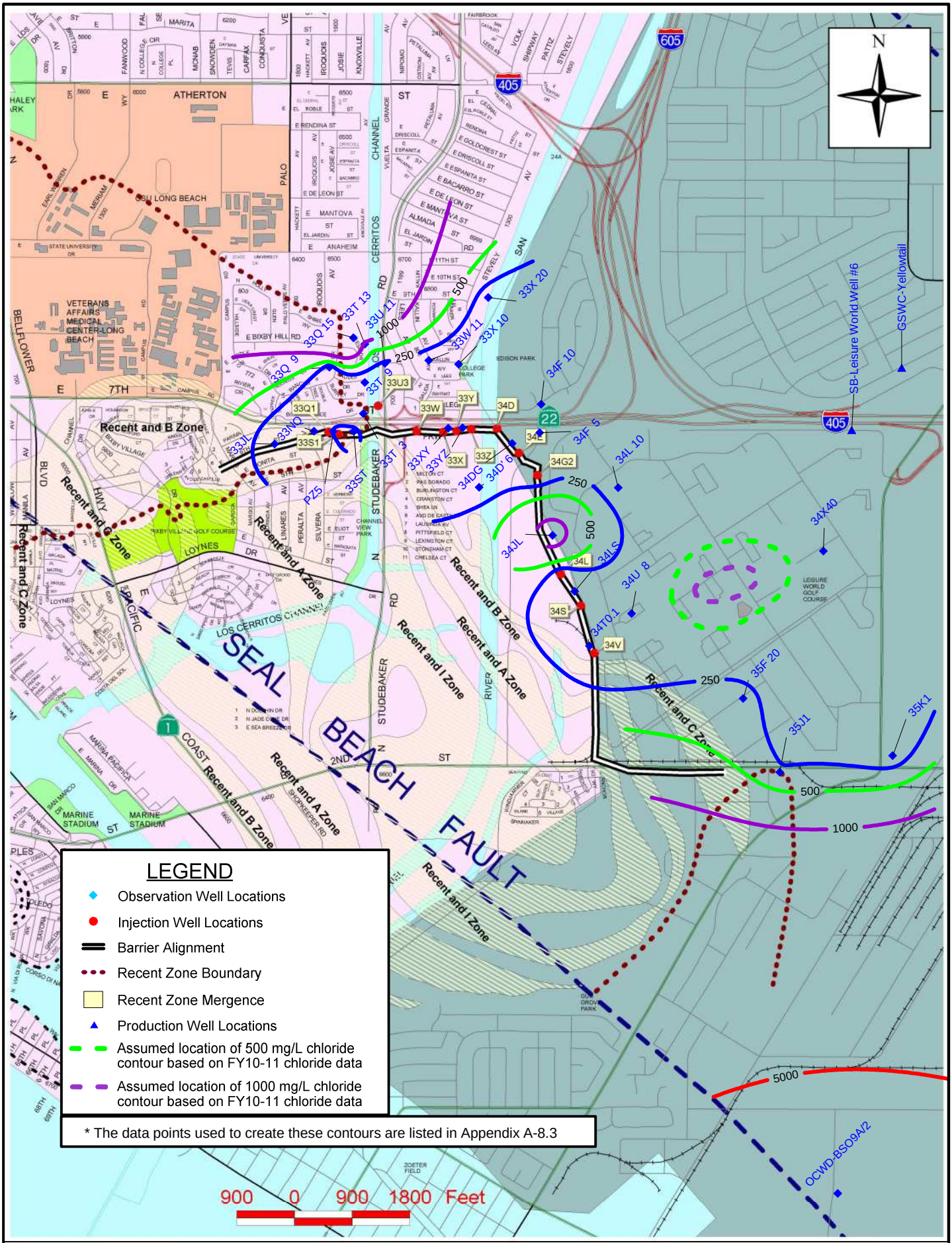
A-7.2

C zone CL.srf

ALAMITOS BARRIER PROJECT
C-ZONE CHLORIDE CONCENTRATIONS
Chloride Data Used for Contours and Cross-Section

No.	PROJ	FCD	DATE	AQUIFER	For Cross-Section (Internodal Wells in **Bold**)						For Contours	MAX CHLORIDE 10-11	Change in Chloride (FY11-12 - FY10-11)
					ELEV 1 (ft)	CHL 1 (mg/L)	ELEV 2 (ft)	CHL 2 (mg/L)	ELEV 3 (ft)	CHL 3 (mg/L)	MAX CHL. 11-12		
1	33S 18	492AG	20120328	C	-225	1,270					1,270	2,150	-880
2	**33ST**	**492BK**	**20120405**	**(C,B)**	**-25**	**299**					**299**	**8,800**	**-8,501**
3	33T 13	492AC	20120409	C	-199	1,230					1,230	600	630
4	33U 11	492AL	20120410	C	-169	1,130					1,130	1,490	-360
5	33W 11	502R	20110921	C	-183	80	-216	90			90	120	-30
6	33X 10	502BB	20120320	C	-190	231	-215	108			231	160	71
7	**33XY**	**502BL**	**20110915**	**C**	**-195**	**60**	**-210**	**70**			**70**	**75**	**-5**
8	**33YZ**	**502AB**	**20110914**	**C**	**-195**	**60**	**-210**	**70**			**70**	**105**	**-35**
9	34D' 6	502BF	20120326	C	-125	11,000					11,000	9,300	1,700
10	**34DG**	**502X**	**20110922**	**C**	**-190**	**90**	**-205**	**90**			**90**	**80**	**10**
11	34F 5	502BU	20110926	C	-191	80	-201	80	-211	80	80	90	-10
12	34F 10	502AP	20110928	C	-211	110					110	110	0
13	**34JL**	**503AR**	**20111013**	**C**	**-161**	**155**					**155**	**110**	**45**
14	34L' 1	503N	20111017	C	-162	300					300	120	180
15	34L 10	502AK	20120315	C	-166	83					83	95	-12
16	**34LS**	**503BF**	**20110927**	**C**	**-133**	**110**	**-151**	**120**	**-163**	**120**	**120**	**100**	**20**
17	**34T0.1**	**503AB**	**20120530**	**C**	**-134**	**999**					**999**	**905**	**94**
18	34U 8	513D	20120604	C	-150	79	-165	82			82	120	-39
19	34X40	513R	20111018	C	-85	60	-101	35			60	500	-440
20	35F 20	513L	20120522	C	-70	187	-78	214	-85	392	392	360	32
21	**35K1**	**523D**	**20120516**	**C**	**-88**	**335**	**-98**	**402**			**402**	**400**	**2**
22	**PZ5**	**492CH**	**20120402**	**(C,B)**	**-24**	**309**					**309**	**200**	**109**
23	SB1_6		20110921	C	n/a	84					84	89	-5
24	33Q1	DP1									50	50	n/a
25	33U3	DP2									50	50	n/a
26	33W	DP3									50	50	n/a
27	33X	DP4									50	50	n/a
28	33Y	DP5									50	50	n/a
29	33Z	DP6									50	50	n/a
30	34D	DP7									50	50	n/a
31	34E	DP8									50	50	n/a
32	34G2	DP9									50	50	n/a
33	34L	DP10									50	50	n/a
34	34S	DP11									50	50	n/a
35	34V	DP12									50	50	n/a

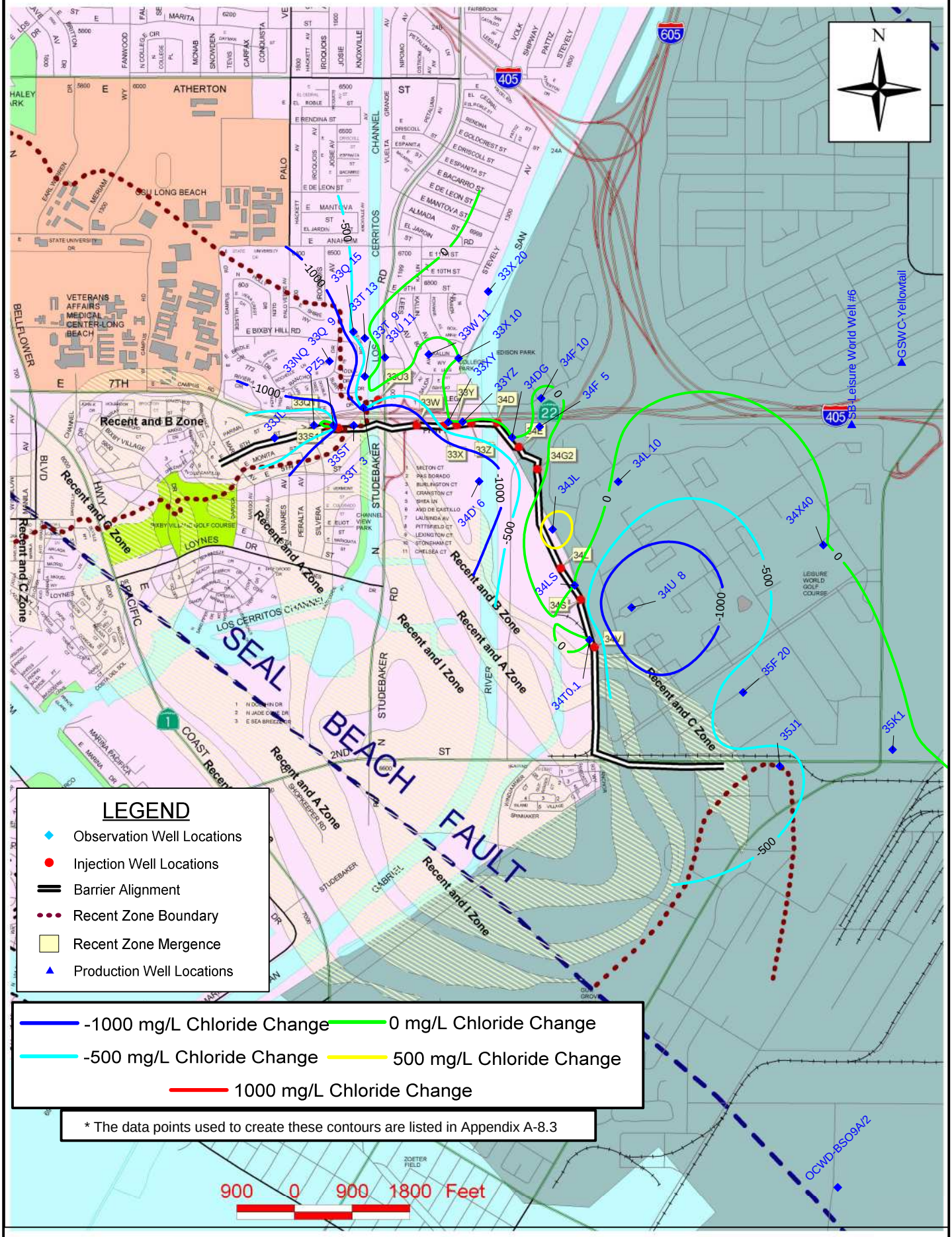
DP = Dummy Point with an assumed chloride concentration of 50 mg/L. Placed at wells that were injecting into this zone during this reporting period.



Alamitos Barrier Project
B Zone Chloride Concentration (mg/L) Contours: Spring 2012

A-8.1

B zone CL.srf



Alamitos Barrier Project
B Zone: Change in Chloride Concentration, Spring 2011 to Spring 2012

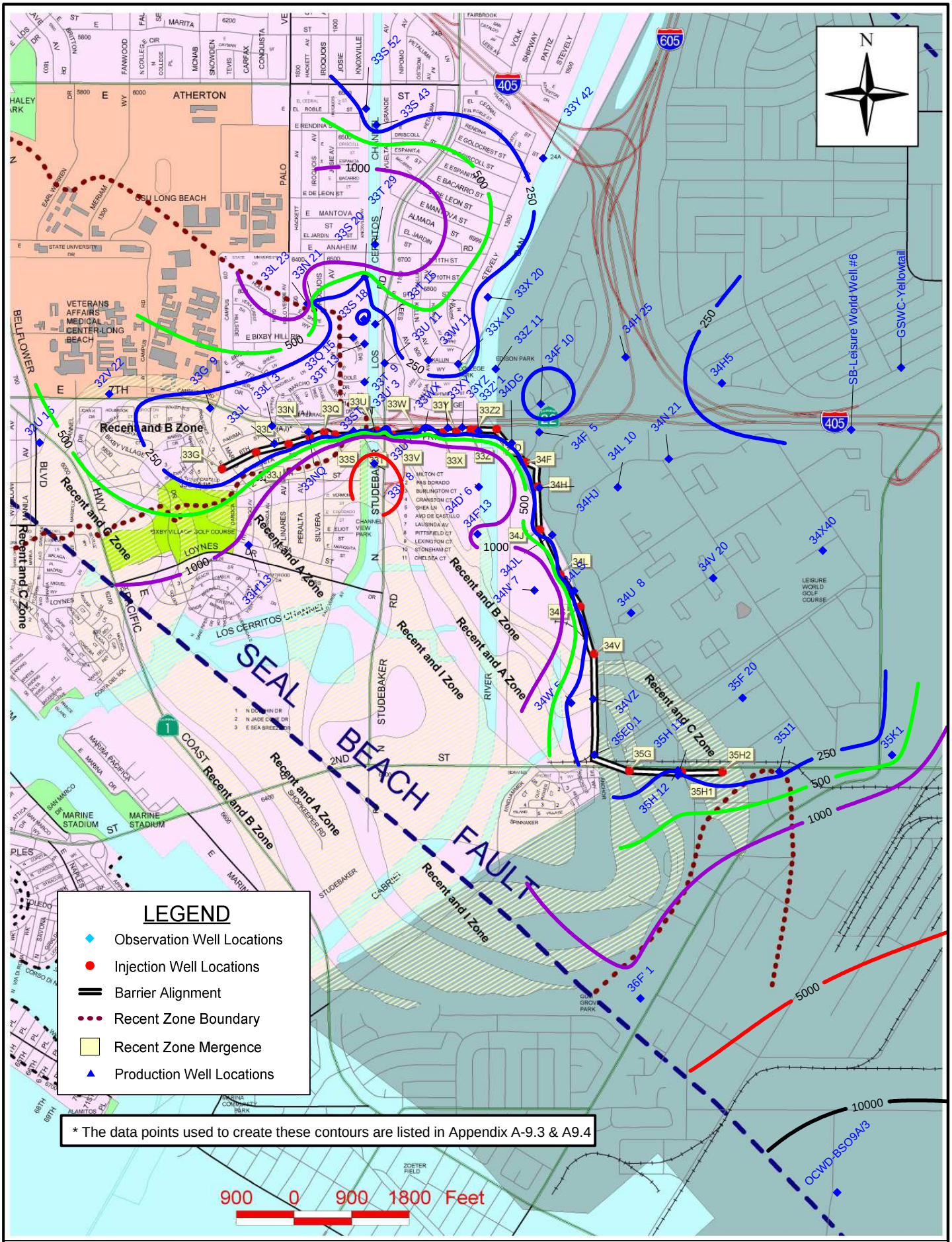
A-8.2

B zone CL.srf

ALAMITOS BARRIER PROJECT
B-ZONE CHLORIDE CONCENTRATIONS
Chloride Data Used for Contours and Cross-Section

No.	PROJ	FCD	DATE	AQUIFER	For Cross-Section (Internodal Wells in **Bold**)						For Contours	MAX CHLORIDE 10-11	Change in Chloride (FY11-12 - FY10-11)
					ELEV 1 (ft)	CHL 1 (mg/L)	ELEV 2 (ft)	CHL 2 (mg/L)	ELEV 3 (ft)	CHL 3 (mg/L)	MAX CHL. 11-12		
1	**33JL**	**492BQ**	**20120405**	**B**	**3**	**80**	**-7**	**89**			**89**	**110**	**-21**
2	**33NQ**	**492BN**	**20120405**	**B**	**-3**	**80**	**-14**	**50**			**80**	**140**	**-60**
3	33Q 9	492CM	20120319	B	-85	70	-95	73	-105	105	105	4,100	-3,995
4	33Q 15	492AN	20120328	B	-263	3,150					3,150	3,450	-300
5	**33ST**	**492BK**	**20120405**	**(C,B)**	**-25**	**299**					**299**	**8,800**	**-8,501**
6	33T 3	492CL	20120320	B	-40	38	-57	38	-75	42	42	160	-118
7	33T 9	492YY	20120409	B	-163	87					87	190	-103
8	33T 13	492AB	20120409	B	-254	754					754	870	-116
9	33U 11	492AK	20120410	B	-162	221					221	170	51
10	33W 11	502S	20110921	B	-241	110	-269	130			130	230	-100
11	33X 10	502BC	20120326	B	-275	95					95	95	0
12	33X 20	502K	20110921	B	-266	130					130	110	20
13	**33XY**	**502BM**	**20110918**	**B**	**-245**	**85**					**85**	**110**	**-25**
14	**33YZ**	**502AC**	**20110914**	**B**	**-214**	**100**	**-263**	**93**			**100**	**86**	**14**
15	34D' 6	502BG	20120321	B	-180	94	-194	110			110	2,200	-2,090
16	**34DG**	**502Y**	**20111013**	**B**	**-232**	**120**	**-257**	**60**			**120**	**110**	**10**
17	34F 5	502BS	20110926	B	-231	60	-260	60			60	90	-30
18	34F 10	502AQ	20110928	B	-269	90					90	135	-45
19	**34JL**	**503AQ**	**20120530**	**B**	**-196**	**1,260**	**-207**	**1,370**			**1,370**	**515**	**855**
20	34L 10	502AL	20120315	B	-224	77	-249	76			77	130	-53
21	**34LS**	**503BE**	**20110927**	**B**	**-188**	**90**					**90**	**95**	**-5**
22	**34T0.1**	**503AC**	**20111006**	**B**	**-174**	**110**	**-207**	**80**	**-239**	**85**	**110**	**90**	**20**
23	34U 8	513E	20111012	B	-225	95					95	2,700	-2,605
24	34X40	513Q	20120523	B	-137	24					24	35	-11
25	35F 20	513K	20120522	B	-115	323					323	550	-227
26	**35J1**	**514M**	**20120517**	**B**	**-128**	**268**	**-143**	**273**	**-148**	**277**	**277**	**905**	**-628**
27	**35K1**	**523A**	**20120516**	**B**	**-127**	**88**	**-142**	**101**	**-157**	**106**	**106**	**150**	**-44**
28	**PZ5**	**492CH**	**20120402**	**(C,B)**	**-24**	**309**					**309**	**200**	**109**
29	OCWD-BSO9A/2		20120412	B	n/a	7,170					7,170	7,460	-290
29	33Q1	DP1									50	50	n/a
30	33U3	DP2									50	50	n/a
31	33W	DP3									50	50	n/a
32	33X	DP4									50	50	n/a
33	33Y	DP5									50	50	n/a
34	33Z	DP6									50	50	n/a
35	34D	DP7									50	50	n/a
36	34E	DP8									50	50	n/a
37	34G2	DP9									50	50	n/a
38	34L	DP10									50	50	n/a
39	34S	DP11									50	50	n/a
40	34V	DP12									50	50	n/a

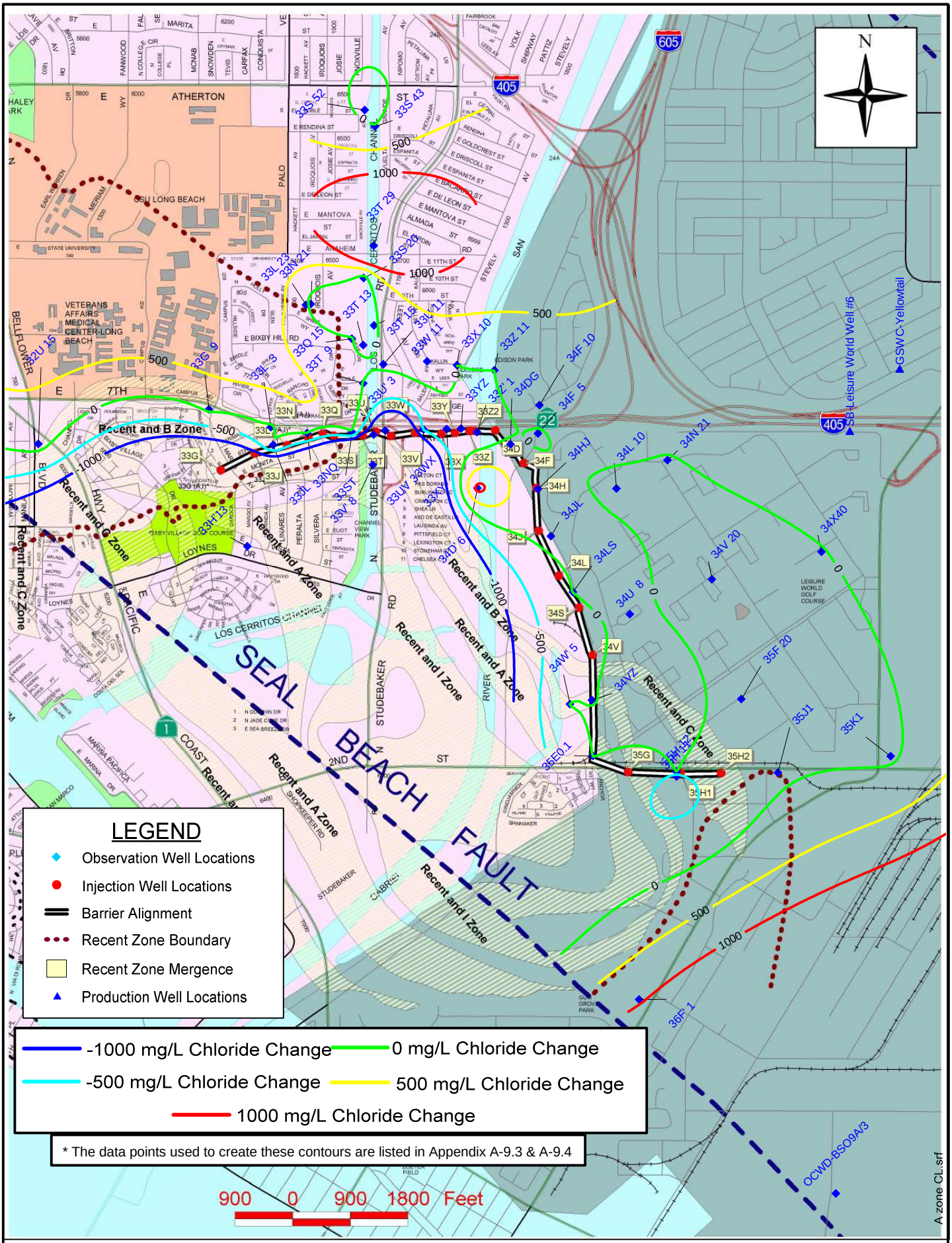
DP = Dummy Point with an assumed chloride concentration of 50 mg/L. Placed at wells that were injecting into this zone during this reporting period.



Alamitos Barrier Project
A Zone Chloride Concentration (mg/L) Contours: Spring 2012

A-9.1

A zone CL.srf



Alamitos Barrier Project

A Zone: Change in Chloride Concentration, Spring 2011 to Spring 2012

A-9.2

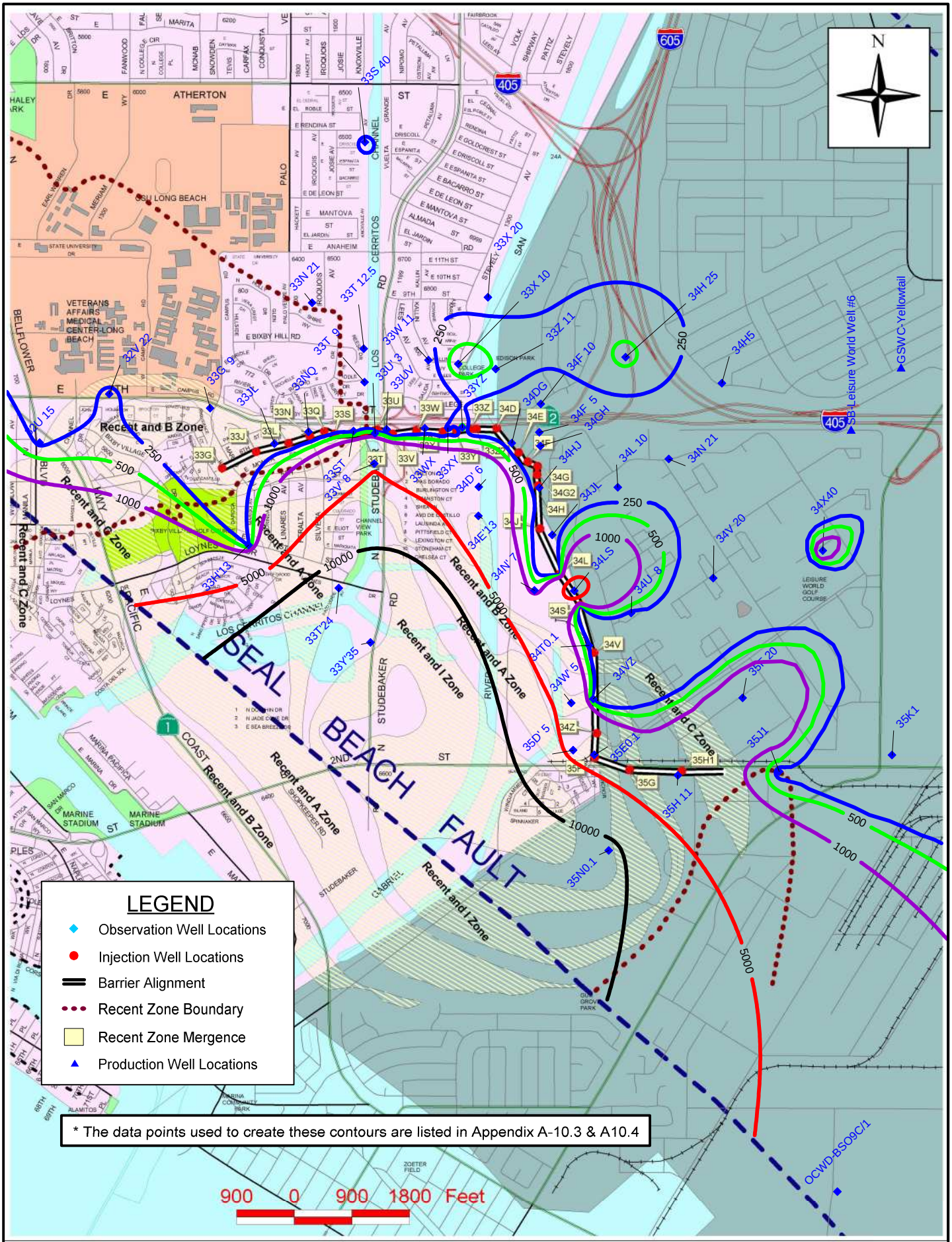
ALAMITOS BARRIER PROJECT
A-ZONE CHLORIDE CONCENTRATIONS
Chloride Data Used for Contours and Cross-Section

No.	PROJ	FCD	DATE	AQUIFER	For Cross-Section (Internodal Wells in **Bold**)						For Contours	MAX CHLORIDE 10-11	Change in Chloride (FY11-12 - FY10-11)
					ELEV 1 (ft)	CHL 1 (mg/L)	ELEV 2 (ft)	CHL 2 (mg/L)	ELEV 3 (ft)	CHL 3 (mg/L)	MAX CHL. 11-12		
1	32U 15	482M	20120403	A	-17	605					605	430	175
2	32V 22	482P	20110211	A	-11	300					300	300	N/A
3	33G 9	482F	20120313	A	-3		-23	187			187	120	67
4	33H'13	493YY	20120313	(R,A)	-18	504	-38	840	-58	1,160	1,160	9,550	-8,390
5	**33JL**	**492BW**	**20120405**	**(A,I)**	**-41**	**67**	**-79**	**61**	**-116**	**58**	**67**	**85**	**-18**
6	33L 3	492	20120319	A	-60	70					70	140	-70
7	33L 23	492RR	20120328	A	-344	1,390					1,390	1,100	290
8	33N 21	492BU	20120313	A	-305	206	-330	155	-346	176	206	510	-304
9	**33NQ**	**492BP**	**20120405**	**(A,I)**	**-48**	**54**	**-92**	**58**	**-136**	**60**	**60**	**75**	**-15**
10	33Q 15	492AM	20120328	A	-337	153					153	140	13
11	33S 18	492AE	20110215	A	-351	310					310	310	N/A
12	33S 20	492BR	20120313	A	-317	133	-336	201	-355	229	229	400	-171
13	33S 43	491E	20120328	A	-333	122	-344	119			122	110	12
14	33S 52	491H	20120315	A	-284	218	-289	217			218	310	-92
15	**33ST**	**492BL**	**20120405**	**A**	**-65**	**50**	**-86**	**47**	**-100**	**42**	**50**	**100**	**-50**
16	33T 9	492TT	20120409	A	-262	75					75	90	-15
17	33T 13	492ZZ	20120409	A	-128	163					163	255	-92
18	33T 15	492SS	20120314	A	-334	117					117	150	-33
19	33T 29	491C	20120328	A	-350	2,560					2,560	70	2,490
20	33U 11	492AJ	20120410	A	-348	166					166	120	46
21	33U' 3	492WW	20120329	A	-89	255					255	1,850	-1,595
22	**33UV**	**492BH**	**20120409**	**A**	**-106**	**112**	**-131**	**180**	**-155**	**470**	**470**	**3,050**	**-2,580**
23	33V' 8	492BY	20120329	(R,A)	-24	7,560	-48	6,690			7,560	14,300	-6,740
24	33W 11	502T	20110921	A	-321	75	-349	500	-376	390	500	220	280
25	**33WX**	**502AF**	**20120522**	**A**	**-258**	**299**	**-281**	**363**	**-297**	**367**	**367**	**835**	**-468**
26	33X 10	502BD	20120326	A	-320	215	-340	249	-356	403	403	405	-2
27	33X 20	502J	20110315	A	-353	100					100	100	N/A
28	**33XY**	**502BN**	**20110915**	**A**	**-279**	**54**	**-296**	**62**	**-311**	**80**	**80**	**170**	**-90**
29	33Y 42	501A	20110308	A	-336	160					160	160	N/A
30	**33YZ**	**502AD**	**20110913**	**A**	**-296**	**70**	**-327**	**75**			**75**	**105**	**-30**
31	**33Z' 1**	**502G**	**20111005**	**A**	**-320**	**40**					**40**	**500**	**-460**
32	33Z 11	502V	20110922	A	-321	90	-346	65			90	90	0
33	34D' 6	502BH	20120321	A	-270	622	-303	2,180	-335	3,710	3,710	2,550	1,160
34	**34DG**	**502Z**	**20110922**	**A**	**-292**	**130**	**-324**	**140**			**140**	**80**	**60**
35	34F 5	502BR	20110926	A	-297	70	-322	65	-347	65	70	140	-70
36	34F 10	502AR	20110928	A	-311	270	-326	500			500	130	370
37	34F'13	503Q	20110303	A	-177	460					460	460	N/A
38	34H 25	502AH	20110324	A	-297	70	-312	70	-331	75	75	75	N/A
39	34H5	512E	20110330	A	-298	350	-313	400	-328	300	400	400	N/A
40	**34HJ**	**502BX**	**20111005**	**A**	**-310**	**80**	**-321**	**65**	**-331**	**60**	**80**	**70**	**10**

ALAMITOS BARRIER PROJECT
A-ZONE CHLORIDE CONCENTRATIONS
Chloride Data Used for Contours and Cross-Section

No.	PROJ	FCD	DATE	AQUIFER	For Cross-Section (Internodal Wells in **Bold**)						For Contours	MAX CHLORIDE 10-11	Change in Chloride (FY11-12 - FY10-11)
					ELEV 1 (ft)	CHL 1 (mg/L)	ELEV 2 (ft)	CHL 2 (mg/L)	ELEV 3 (ft)	CHL 3 (mg/L)	MAX CHL. 11-12		
41	**34JL**	**503AP**	**20110927**	**A**	**-263**	**70**	**-288**	**55**	**-308**	**185**	**185**	**85**	**100**
42	34L 10	502AM	20120315	A	-310	65	-330	66	-354	64	66	110	-44
43	**34LS**	**503BD**	**20110927**	**A**	**-238**	**80**	**-283**	**90**			**90**	**85**	**5**
44	34N 21	512B	20120315	A	-328	89	-354	92			92	110	-18
45	34N' 7	503AF	20110228	A	-106	150	-144	3,300	-176	3,300	3,300	3,300	N/A
46	34U 8	513F	20111012	A	-280	120	-310	130			130	120	10
47	34V 20	513B	20111012	A	-234	100	-265	110	-292	110	110	200	-90
48	**34VZ**	**503BH**	**20111012**	**A**	**-146**	**100**	**-156**	**80**			**100**	**120**	**-20**
49	34W' 5	503AJ	20120314	A	-81	97	-101	167	-119	161	167	160	7
50	34X40	513P	20111018	A	-202	50	-232	65			65	75	-10
51	**35E0.1**	**503BK**	**20120523**	**A**	**-74**	**105**					**105**	**100**	**5**
52	35F 20	513J	20120522	A	-129	110	-158	148			148	220	-72
53	**35H 11**	**514G**	**20120521**	**A**	**-123**	**142**	**-146**	**443**			**443**	**1,300**	**-857**
54	**35H 12**	**514D**	**20111019**	**A**	**-137**	**150**					**150**	**120**	**30**
55	**35J1**	**514L**	**20120517**	**A**	**-193**	**49**	**-208**	**88**	**-228**	**203**	**203**	**260**	**-57**
56	**35K1**	**523B**	**20120515**	**A**	**-197**	**74**	**-212**	**68**	**-227**	**354**	**354**	**430**	**-76**
57	36F' 1	505D	20120404	A	-99	1,160					1,160	220	940
58	OCWD-BSO9A/3		20120412	A	n/a	13,600					13,600	8,030	5,570
59	33G	DP1									50	50	n/a
60	33J	DP2									50	50	n/a
61	33L	DP3									50	50	n/a
62	33N	DP4									50	50	n/a
63	33Q	DP5									50	50	n/a
64	33S	DP6									50	50	n/a
65	33T	DP7									50	50	n/a
66	33U	DP8									50	50	n/a
67	33V	DP9									50	50	n/a
68	33W	DP10									50	50	n/a
69	33X	DP11									50	50	n/a
70	33Y	DP12									50	50	n/a
71	33Z	DP13									50	50	n/a
72	33Z2	DP14									50	50	n/a
73	34D	DP15									50	50	n/a
74	34F	DP16									50	50	n/a
75	34H	DP17									50	50	n/a
76	34J	DP18									50	50	n/a
77	34L	DP19									50	50	n/a
78	34S	DP20									50	50	n/a
79	34V	DP21									50	50	n/a
80	35G	DP22									50	50	n/a
81	35H1	DP23									50	50	n/a
82	35H2	DP24									50	50	n/a

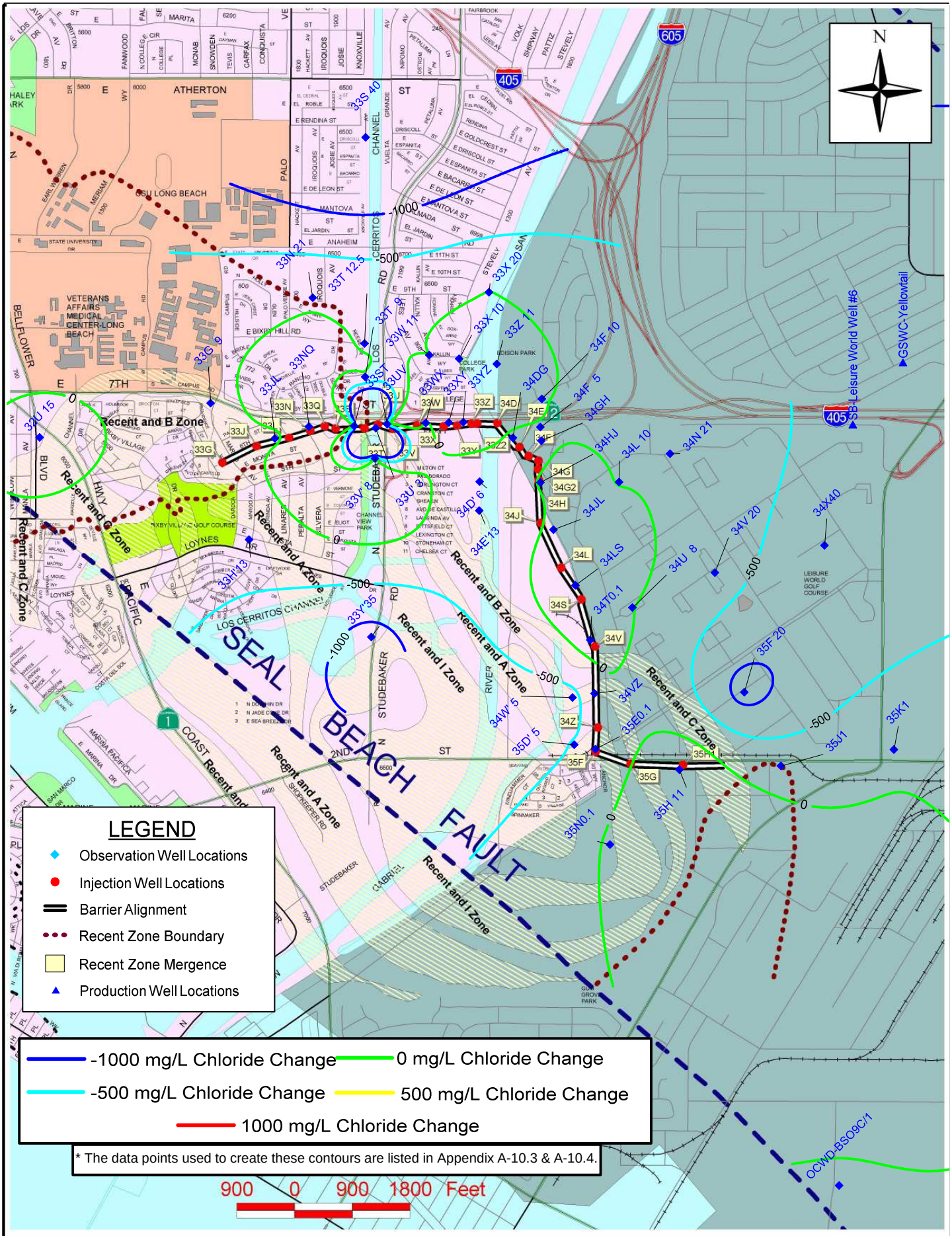
DP = Dummy Point with an assumed chloride concentration of 50 mg/L. Placed at wells that were injecting into this zone during this reporting period.



Alamitos Barrier Project
I Zone Chloride Concentration (mg/L) Contours: Spring 2012

A-10.1

I zone CL.srf



Alamitos Barrier Project
I Zone: Change in Chloride Concentration, Spring 2011 to Spring 2012

A-10.2

I zone CL.sif

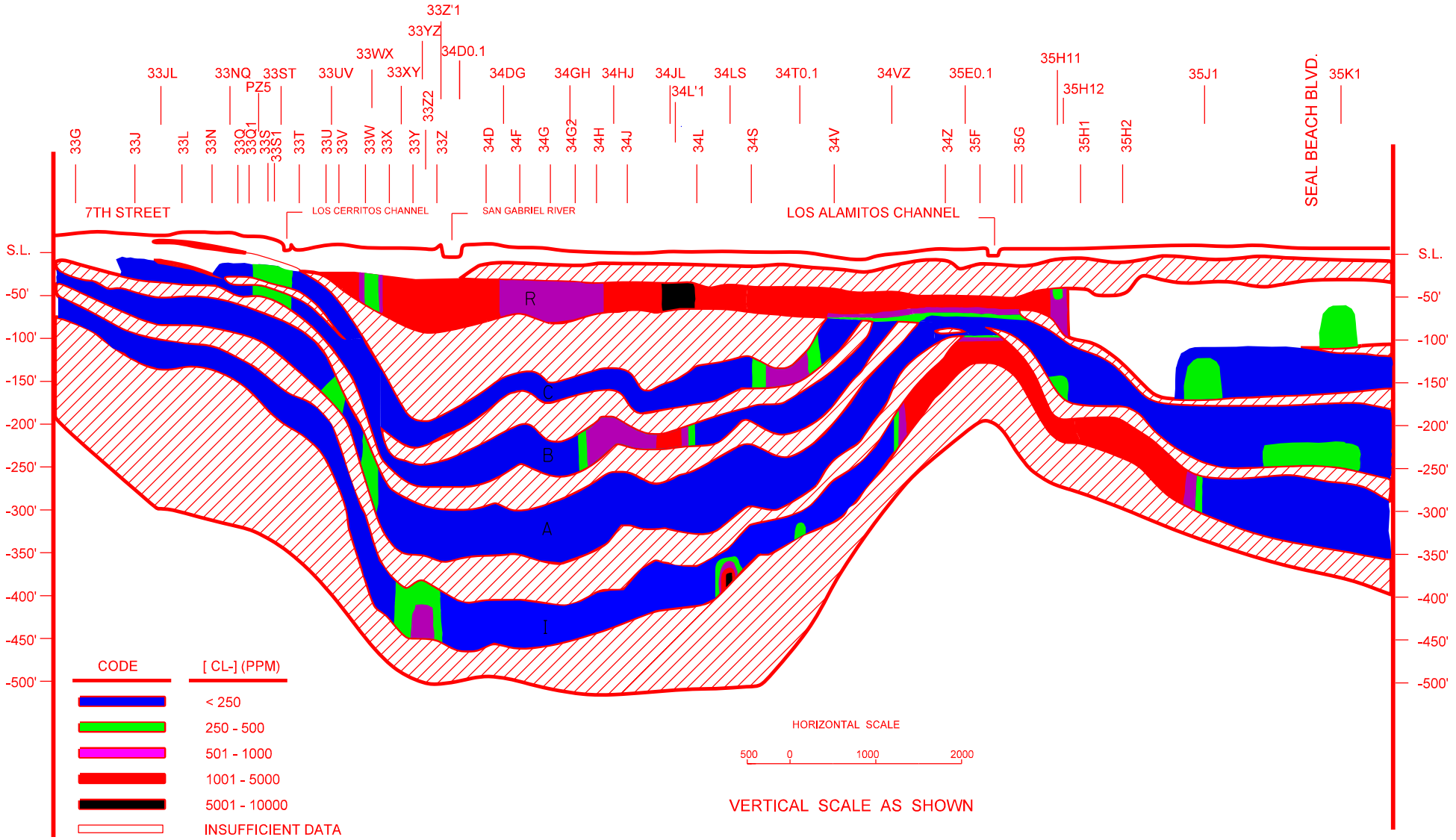
ALAMITOS BARRIER PROJECT
I-ZONE CHLORIDE CONCENTRATIONS
Chloride Data Used for Contours and Cross-Section

No.	PROJ	FCD	DATE	AQUIFER	For Cross-Section (Internodal Wells in **Bold**)						For Contours	MAX CHLORIDE 10-11	Change in Chloride (FY11-12 - FY10-11)
					ELEV 1 (ft)	CHL 1 (mg/L)	ELEV 2 (ft)	CHL 2 (mg/L)	ELEV 3 (ft)	CHL 3 (mg/L)	MAX CHL. 11-12		
1	32U 15	482L	20120403	I	-74	196					196	85	111
2	32V 22	482N	20110210	I	-51	280					280	280	N/A
3	33G 9	482G	20120313	I	-34	66	-68	88	-78	87	88	145	-58
4	33H'13	493XX	20120313	I	-89	233					233	550	-317
5	**33JL**	**492BW**	**20120405**	**(A,I)**	**-41**	**67**	**-79**	**61**	**-116**	**58**	**67**	**85**	**-18**
6	33N 21	492BV	20120313	I	-457	70	-468	70			70	130	-60
7	**33NQ**	**492BP**	**20120405**	**(A,I)**	**-48**	**54**	**-92**	**58**	**-136**	**60**	**60**	**75**	**-15**
8	33S 40	491F	20120314	I	-470	275					275	2,300	-2,025
9	**33ST**	**492BM**	**20120405**	**I**	**-130**	**124**	**-148**	**88**	**-163**	**89**	**124**	**140**	**-16**
10	33T 9	492XX	20120409	I	-364	70					70	130	-60
11	33T 12.5	492BT	20120320	I	-423	97	-438	96	-443	96	97	160	-63
12	33T'24	493RR	20110217	I	-52	13,500	-75				13,500	13,500	N/A
13	33U' 3	492QQ	20120329	I	-110	663					663	16,800	-16,137
14	**33UV**	**492BJ**	**20120409**	**I**	**-209**	**71**	**-228**	**50**	**-246**	**49**	**71**	**160**	**-89**
15	33V' 8	492BX	20120329	I	-109	4,620	-130	4,820			4,820	4,800	20
16	33W 11	502U	20110921	I	-423	100	-446	110	-468	110	110	110	0
17	**33WX**	**502AG**	**20120522**	**I**	**-374**	**50**	**-391**	**49**	**-405**	**49**	**50**	**80**	**-30**
18	33X 10	502BE	20120326	I	-420	709	-440	491	-460		709	445	264
19	33X 20	502H	20110921	I	-442	110					110	100	10
20	**33XY**	**502BP**	**20110915**	**I**	**-404**	**260**	**-417**	**260**	**-431**	**330**	**330**	**215**	**115**
21	33Y'35	493ZZ	20120313	I	-67	25,400					25,400	26,600	-1,200
22	**33YZ**	**502AE**	**20110913**	**I**	**-402**	**150**	**-433**	**650**			**650**	**130**	**520**
23	33Z 11	502W	20110922	I	-417	200	-437	220	-457	480	480	290	190
24	34D' 6	502BI	20120321	I	-400	3,070	-410	3,090	-418	3,380	3,380	3,800	-420
25	**34DG**	**502AA**	**20111013**	**I**	**-402**	**90**	**-432**	**85**			**90**	**160**	**-70**
26	34E'13	503AT	20120326	I	-289	2,290	-308	1,630			2,290	2,650	-360
27	34F 5	502BQ	20110926	I	-411	60	-426	60	-441	80	80	90	-10
28	34F 10	502AS	20110928	I	-416	80	-442	90			90	80	10
29	34GH	502BV	20110926	I	-412	80	-427	55	-437	70	80	100	-20
30	34H 25	502AJ	20110324	I	-407	545	-427	585	-446	575	585	585	N/A
31	34H5	512D	20110330	I	-408	90	-423	110	-443	70	110	110	N/A
32	**34HJ**	**502BW**	**20111005**	**I**	**-407**	**70**	**-417**	**105**	**-427**	**80**	**105**	**80**	**25**
33	**34JL**	**503AN**	**20111013**	**I**	**-383**	**80**	**-403**	**125**			**125**	**75**	**50**
34	34L 10	502AN	20120315	I	-404	29	-426	29			29	38	-8
35	**34LS**	**503BC**	**20120530**	**I**	**-338**	**168**	**-364**	**9,810**			**9,810**	**9,450**	**360**
36	34N 21	512C	20120315	I	-423	71	-448	70			71	120	-49
37	34N' 7	503AG	20110228	I	-221	290	-254	610	-274	500	610	610	N/A

ALAMITOS BARRIER PROJECT
I-ZONE CHLORIDE CONCENTRATIONS
Chloride Data Used for Contours and Cross-Section

No.	PROJ	FCD	DATE	AQUIFER	For Cross-Section (Internodal Wells in **Bold**)						For Contours	MAX CHLORIDE 10-11	Change in Chloride (FY11-12 - FY10-11)
					ELEV 1 (ft)	CHL 1 (mg/L)	ELEV 2 (ft)	CHL 2 (mg/L)	ELEV 3 (ft)	CHL 3 (mg/L)	MAX CHL. 11-12		
38	**34T0.1**	**503AD**	**20111006**	**I**	**-289**	**140**	**-312**	**170**	**-334**	**260**	**260**	**95**	**165**
39	34U 8	513G	20111012	I	-360	180	-375	170			180	170	10
40	34V 20	513C	20111012	I	-386	110					110	340	-230
41	**34VZ**	**503BG**	**20111013**	**I**	**-214**	**80**	**-224**	**80**			**80**	**130**	**-50**
42	34W' 5	503AK	20120314	I	-156	3,650					3,650	4,350	-700
43	34X40	513N	20120523	I	-331	2,750	-346	2,800			2,800	3,600	-800
44	35D' 5	503AM	20120314	I	-89	4,080					4,080	4,550	-470
45	**35E0.1**	**503BJ**	**20120523**	**I**	**-114**	**3,640**					**3,640**	**4,100**	**-460**
46	35F 20	513H	20120522	I	-235	2,260	-245	3,540	-255	3,580	3,580	4,800	-1,220
47	**35H 11**	**514H**	**20120521**	**I**	**-203**	**1,030**					**1,030**	**550**	**480**
48	**35J1**	**513M**	**20120517**	**I**	**-261**	**113**	**-271**	**124**	**-281**	**124**	**124**	**315**	**-191**
49	**35K1**	**523C**	**20120516**	**I**	**-363**	**26**	**-373**	**26**			**26**	**80**	**-54**
50	35N0.1	504N	20120314	I	-71	11,200					11,200	11,150	50
51	OCWD-BSO9C/1		20120412	I	n/a	2,920					2,900	2,920	-20
52	33G	DP1									50	50	n/a
53	33J	DP2									50	50	n/a
54	33L	DP3									50	50	n/a
55	33N	DP4									50	50	n/a
56	33Q	DP5									50	50	n/a
57	33S	DP6									50	50	n/a
58	33U	DP7									50	50	n/a
59	33V	DP8									50	50	n/a
60	33W	DP9									50	50	n/a
61	33X	DP10									50	50	n/a
62	33Y	DP11									50	50	n/a
63	33Z	DP12									50	50	n/a
64	33Z2	DP13									50	50	n/a
65	34D	DP14									50	50	n/a
66	34E	DP15									50	50	n/a
67	34F	DP16									50	50	n/a
68	34G2	DP17									50	50	n/a
69	34H	DP18									50	50	n/a
70	34J	DP19									50	50	n/a
71	34L	DP20									50	50	n/a
72	34S	DP21									50	50	n/a
73	34V	DP22									50	50	n/a

DP = Dummy Point with an assumed chloride concentration of 50 mg/L. Placed at wells that were injecting into this zone during this reporting period.



CHLORIDE SECTION ALONG THE BARRIER

Spring 2012

Note: The data points used to create this cross setion are listed in the Appendix A-6.3, 7.3, 8.3, 9.3, 9.4, 10.3, & 10.4

ALAMITOS BARRIER PROJECT
Overview Map

N

POINT A

POINT B

POINT C

POINT D

Leo J. Vander Lans Water Treatment Facility

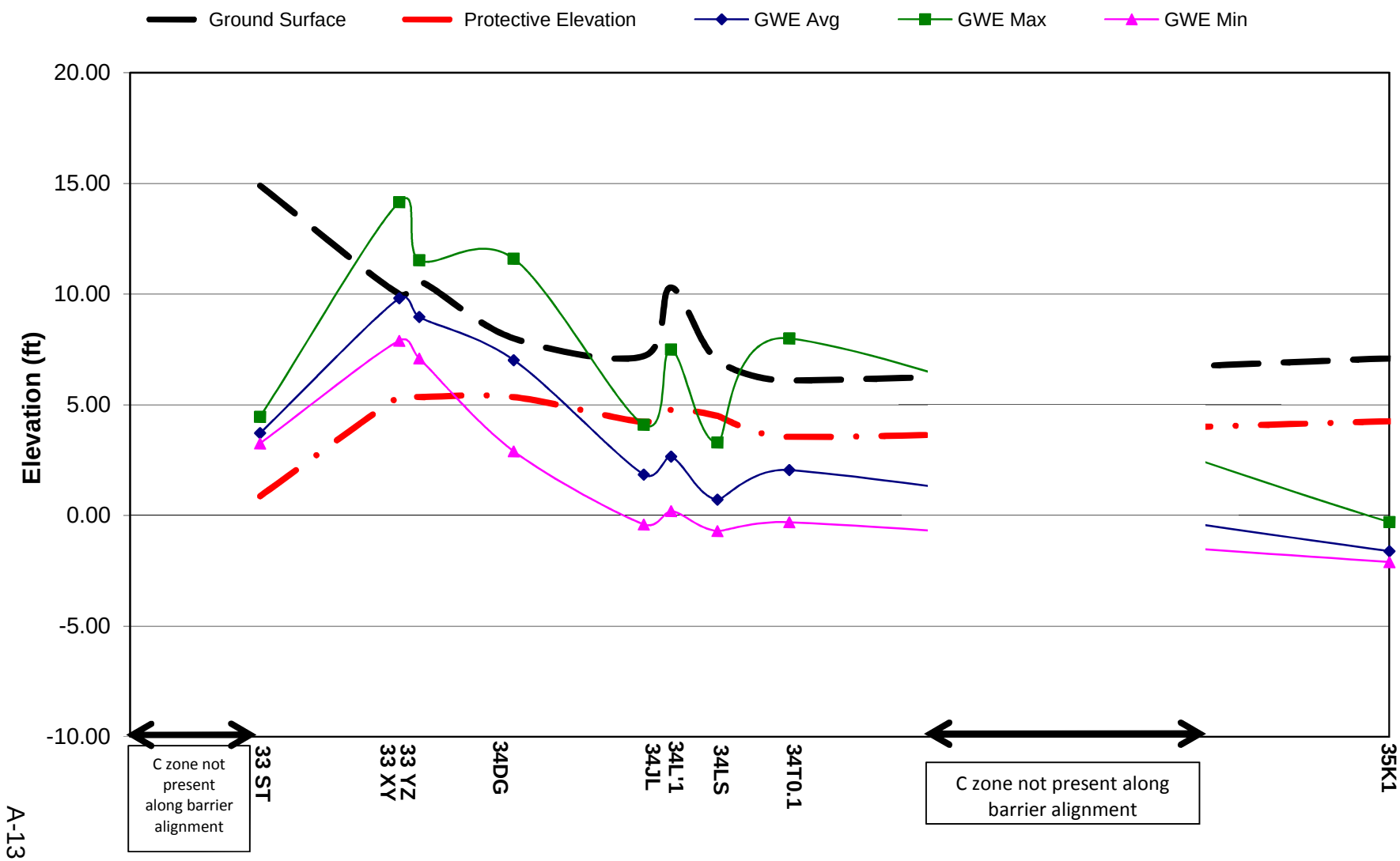
ABP Unit 13 - 8 New Observation Wells. One well between 33G and 33J and the rest westerly of the current alignment to fill data gaps and consider potential future expansion.

900 0 900 1800 Feet

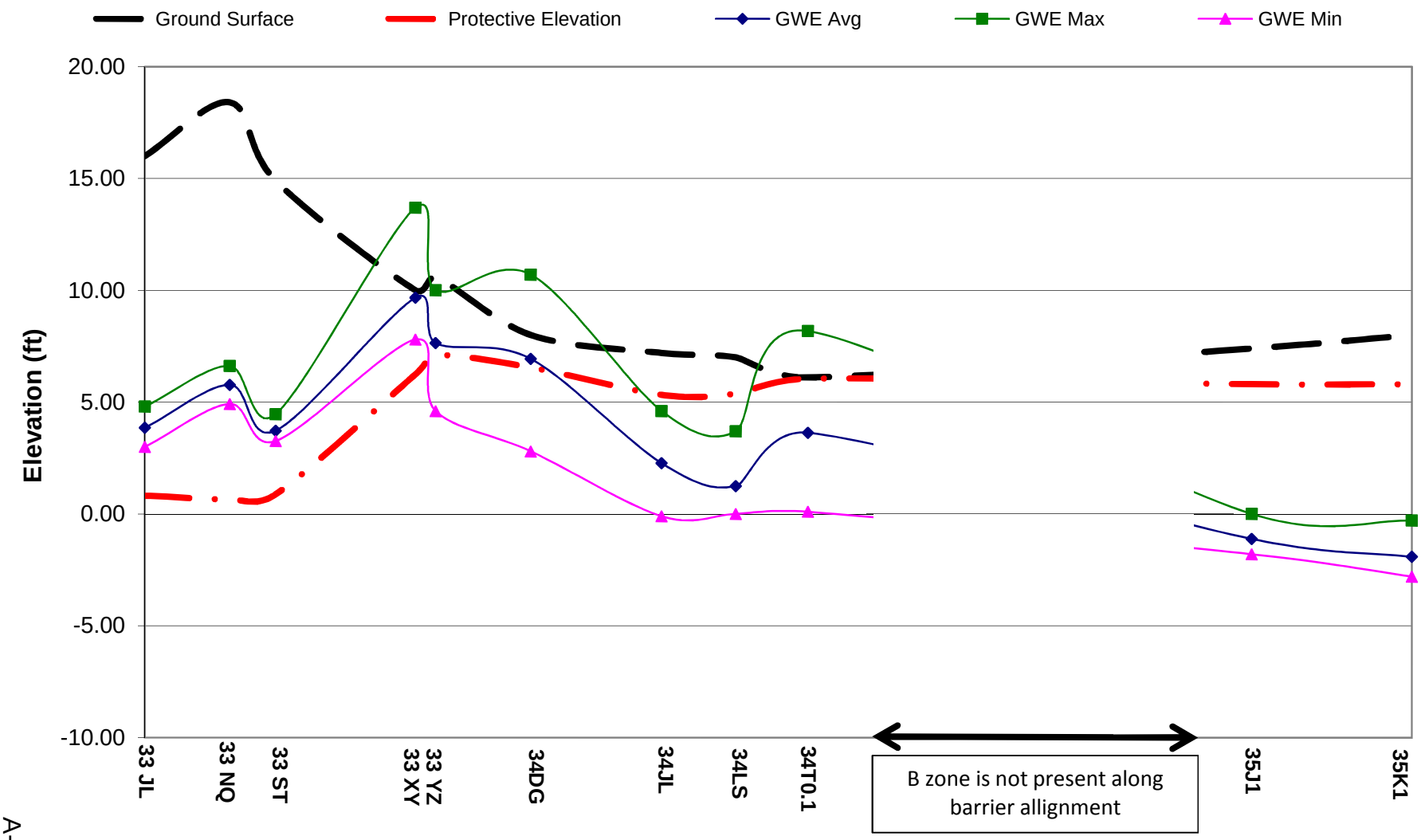
LEGEND

- Extraction Well
- Observation Well
- LACFCD Injection Well
- OCWD Injection Well
- ABP Water Supply Line (owner: LACFCD/OCWD)
- ABP Water Supply Line (owner: LACFCD)
- ABP Water Supply Line (owner: OCWD)
- Reclaimed Water Delivery Line (owner: WRD)

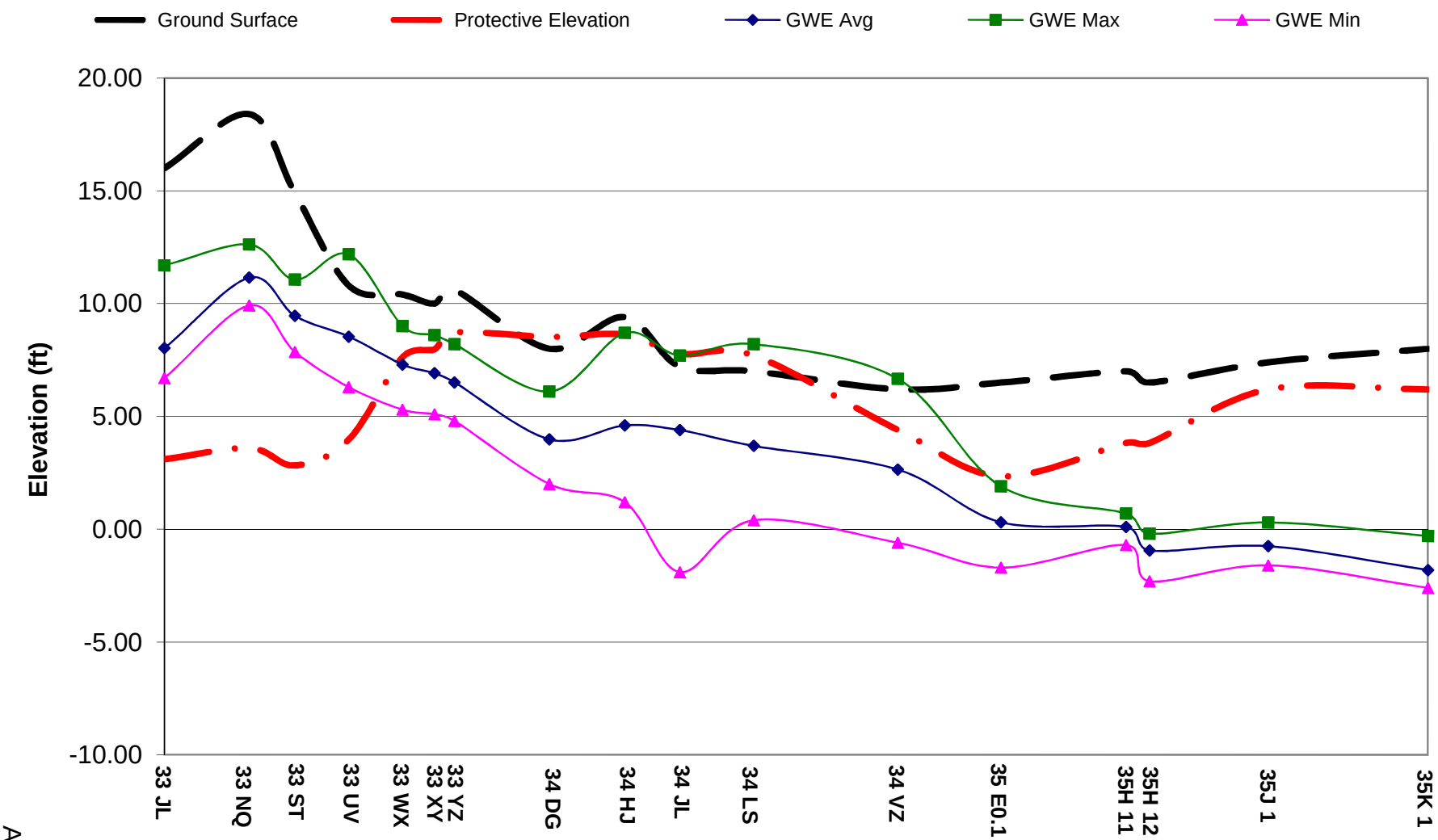
C Zone - Groundwater Elevation (GWE) Along the ABP FY 2011-2012



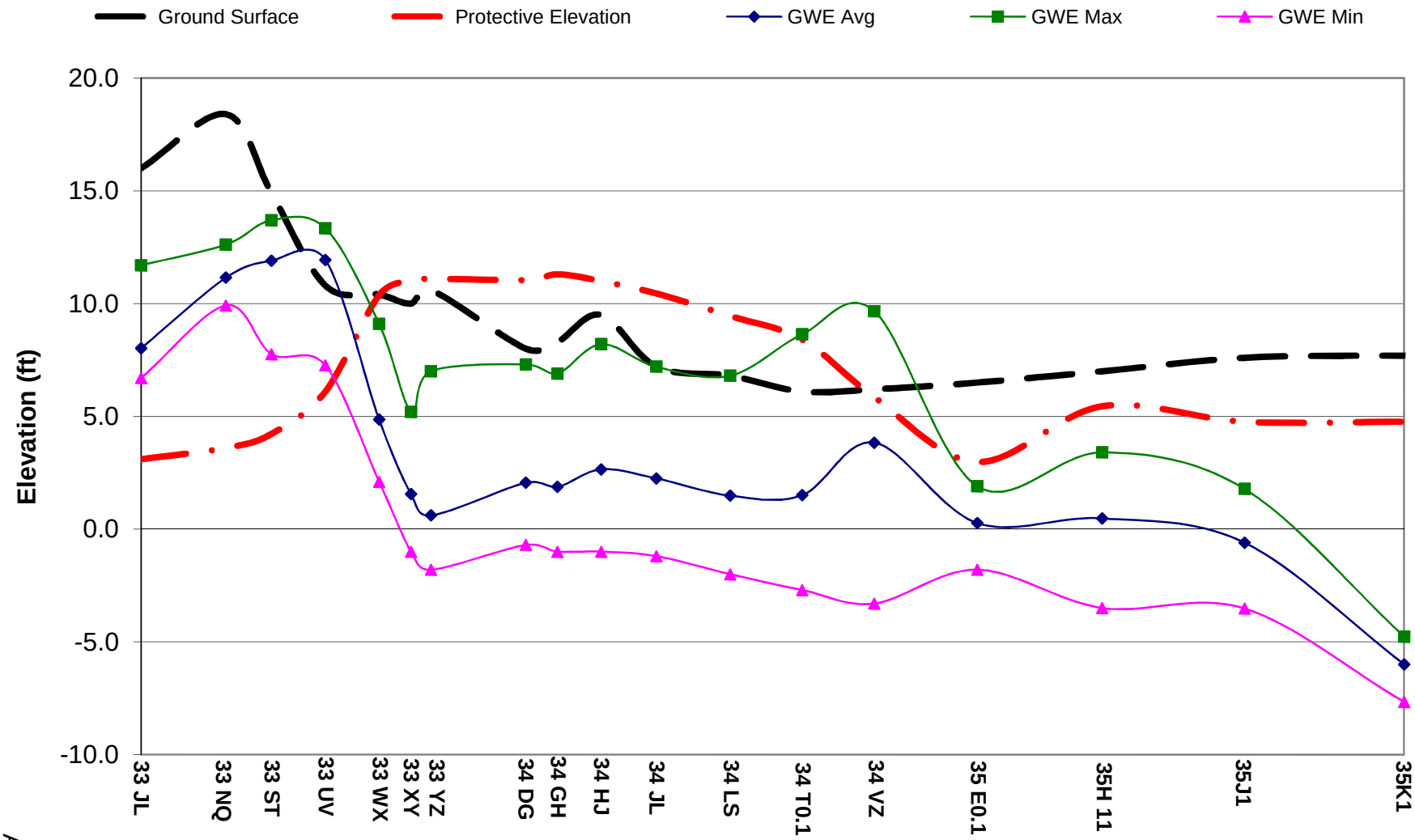
B Zone - Groundwater Elevation (GWE) Along the ABP FY 2011-2012



A Zone - Groundwater Elevation (GWE) Along the ABP FY 2011-2012



I Zone - Groundwater Elevation (GWE) Along the ABP FY 2011-2012



Current Capital Improvement Projects and Contracts (July 2011 through June 2012)

Board Award Date	Project Title	Description	Contractor	Final Contract Amount	Field Acceptance
03/02/2010	Condition Assessment of the ABP Wells and Water Supply Facilities	Assessment of ABP supply line, laterals, appurtenances, and wells (incl. injection, observation, and optionally extraction)	CH2M Hill	$636,221.32 ($200,000 each from OCWD & WRD)	March 2012 Final Report
06/29/2010	ABP, DGBP, and WCBBP Injection Well Condition Assessment	Assessment of injection wells on all three barriers (including the 14 ABP casings NOT a part of the ABP Condition Assessment)	MWH	$2,356,474 (ABP portion = $361,188)	July 2012 Final Report
08/14/2012	ABP Unit 13 - Observation Wells	Construction of 8 new observation wells (21 casings total) near west end of the ABP	Bakersfield Well and Pump	$1,511,288 [Pending] ($300,000 from WRD)	May 2013 [Estimated]
Anticipated 2013 by OCWD	ABP Unit 14 - Injection and Observation Wells	Construction of 17 new clustered injection wells (8 locations), 4 nested observation wells, and 2 shallow piezometers	Unknown	$8,826,000 total $1,363,000 for LACFCD facilities [Estimated]	Fall 2015 [Estimated]

Note: For a full history of improvement projects and contracts on record, please contact LACDPW.

Summary of the Alamitos Barrier Project Shutdowns (July 2011 through June 2012)

Shutdown	Startup	Duration (days)	Impacted Portion of ABP	Reason	Addressed By	Means of Repair/Remediation
08/16/2011	10/15/2011	60	Injection Wells 34L through 34V	Abnormally high groundwater levels prevented complete redevelopment and nearby observation wells pressurized/flooded even without injection.	LACDPW	Closely monitored groundwater elevations and resumed injections when possible.
12/01/2011	12/13/2011	12	Entire Barrier	MWD's planned maintenance on South Coast Feeder line the week of 12/5/11.	MWD/ LACDPW	Reopened PRV, charged pipeline, and resumed injection once MWD's supply at LB-07A became available.
12/28/2011	03/15/2012	78	Well 33T	Suspected return of surface leakage.	LACDPW	Verified the surface leakage and resumed injection with limited flowrate. Demolished slab to investigate leakage, and rebuilt slab in preparation for repair using pressure grouting.
02/11/2012	02/15/2012	4	Entire Barrier	Leak from 1" hole on CMLCS pipe within Valve Vault #2 (Station 186+75), approximately 1 foot downstream of the isolation valve (24" butterfly) and within the 24” x 27” enlarger.	LACDPW	Repaired/welded pipeline section, charged pipeline, and resumed injection.
05/01/2012	05/03/2012	2	Entire Barrier	Water was gushing from within (and eroding) the westerly San Gabriel River levee, just north of Hwy22 (upstream of T-vault). LACFCD staff suspected a potential break in the nearby ABP water supply pipeline.	LACDPW	Closed isolation valves to shut down water supply and turned off all ABP injection. It was later discovered that the break occurred on an LADWP water line feeding the Haynes Plant instead. Charge line; resumed operations; reclaimed water back online 5/9/12.

Notes:

* Routine and/or minor shutdowns of individual wells are not listed here but are included in Figure 3 of the Annual JMC Report.
* For a full history of shutdowns on record, please contact LACDPW.

ALAMITOS BARRIER PROJECT COST FOR FY 2011-12

ITEM NO.	DESCRIPTION	JOB NO.	DESCRIPTION	SERVICES AND SUPPLIES	FY 2011-12 BUDGET	% BUDGET FY 11-12	OCWD SHARE 27%	OCWD BUDGET FY 11-12	% OCWD BUDGET FY 11-12	LADPW SHARE	LADPW BUDGET FY 11-12	% LADPW BUDGET FY 11-12
1.	Analysis and direction of injection operations	H0321551	ANALYSIS & DIRECT OF INJ OPR	72,286.09								
			Subtotal #1	**72,286.09**	100,000	72.3	**19,711.20**	35,000	56.3	52,575	65,000	80.9
2.	Maintenance and repair of injection wells	F6004011	ABP MAINT INJECTION WELLS	211,091.59								
		F5064011	INJECT. WELLS-MAINTAIN(ALAMITOS)	55,117.44								
		H0321911	ABP TELEMETRY SYSTEM MAINTENANCE	123,342.52								
		F54732152	REPAIR WELL 33T - A.B.P.	1,223.89								
			Subtotal #2	**390,775.43**	180,000	217.1	**106,557.91**	63,000	169.1	284,218	117,000	242.9
3.	Operation of injection	F6004000	ABP RECHARGE OPER U/S	34,532.05								
			Subtotal #3	**34,532.05**	200,000	17.3	**9,416.31**	70,000	13.5	25,116	130,000	19.3
4.	Analysis and direction of extraction operations	H0321555	ANALYSIS & DIR OF EXTR OPER	0.00								
	(No cost to OCWD)		Subtotal #4	**0.00**	0	N/A	**0.00**	0	0.0	-	-	-
5.	Maintenance, and repair of extraction wells											
	(No cost to OCWD)		Subtotal #5	**0.00**	5,000	N/A	**0.00**	0	0.0	-	5,000	0.0
6.	Operation of extraction wells	F6000090	ELEC UTIL BILL FOR EXT	1,179.81								
	(No cost to OCWD)		Subtotal #6	**6,219.31**	5,200	119.6	**0.00**	0	0.0	6,219	5,200	119.6
7.	Maintenance and repair of distribution system	H0321569	ALAMITOS BARRIER PROJECT	242,197.47								
		H0321899	RW Mitigation for Existing ABP Faci	7,004.51								
		F6001904	CONDUCT QUARTERLY INSPECTION	228.63								
		F6001907	INSPECT CRANE PRES REDUCE - ABP	803.26								
		F6001920	CONDUCT QUARTERLY INSPECTION	233.53								
		F6004010	ABP MAINT AIR/VAC-BLWOFF U/S	2,201.11								
		F6004012	MAINT PRS - ABP	52,159.07								
		N2420007	MISC. SUPPLIES SEAWATER INTRUS.	1,007.30								
		F6004013F	Locate and Mark Barrier Proj u/grnd	3,922.99								
		F6004014F	Locate & Mark Barrier Proj U/ Grnd.	2,709.49								
		HF01512000	DGBP/ABP Maint & Repair - ABP meter	5,144.44								
			Subtotal #7	**317,611.81**	350,000	90.7	**86,607.41**	122,500	70.7	231,004	227,500	101.5
8.	Maintenance of observation wells	F5064044	OBSERV. WELLS-CLEANOUT(ALAMITOS)	190,300.24								
			Subtotal #8	**190,300.24**	100,000	190.3	**51,891.68**	35,000	148.3	138,409	65,000	212.9
9.	Collection of groundwater data	H0321552	COLLECTN OF GRNDWTR DATA	145,512.74								
			Subtotal #9	**145,512.74**	90,000	161.7	**39,678.88**	31,500	126.0	105,834	58,500	180.9
10.	Yard Maintenance	F6003124	BUILDING MAINTENANCE - NONRESI	6,658.57								
		FFM34107	Facility Maintenance Alamitos Yd F1	64,171.83								
	(Flat Fee from OCWD)		Subtotal #10	**70,830.40**	40,000	177.1	**375.00**	375	100.0	70,455	39,625	177.8
11.	Well redevelopment	H0321565	NPDES MONITOR. & REPORT.	40,372.25								
		H0321554	WELL REDEVELOPMENT	159,618.54								
		F54480362	REDEVELOP INJ. WELL, 35F (I ZONE) -	4,918.19								
		F54504579	REDEVELOP INJ. WELL, 34Z (I ZONE) -	13,666.50								
		F54504583	REDEVELOP INJ. WELL, 34V (A ZONE) -	1,499.91								
		F54551769	REDEVELOP INJ. WELL, 34V (I ZONE) -	13,423.46								
		F54569382	REDEVELOP INJECTION WELL 34F (I ZON	11,310.65								
		F54569390	REDEVELOP INJECTION WELL 34F (A ZON	6,244.35								
		F54574419	REDEVELOP INJ. WELL, 34S (I ZONE) -	6,589.72								
		F54574487	REDEVELOP INJ. WELL, 34S (CB ZONE)	9,616.21								
		F54585996	REDEVELOP INJ. WELL, 34H (I ZONE) -	15,081.79								
		F54585998	REDEVELOP INJ. WELL, 34H (A ZONE) -	10,977.76								
		F54586000	REDEVELOP INJ. WELL, 34G2 (I ZONE)	10,838.68								
		F54586002	REDEVELOP INJ. WELL, 34G2 (BC ZONE)	14,237.15								
		F54601637	REDEVELOP INJ. WELL, 34E (I ZONE) -	13,673.41								
		F54601703	REDEVELOP INJ. WELL, 34E (CB ZONE)	10,229.24								
		F54601704	REDEVELOP INJ. WELL, 35H2 (A ZONE)	16,074.03								
		F54616955	REDEVELOP INJ. WELL, 34L - A.B.P.	13,006.80								
		F54616956	REDEVELOP INJ. WELL, 34J - A.B.P.	15,169.75								
		F54625789	REDEVELOP INJ. WELL, 35H1 - A.B.P.	22,155.94								
		F54625791	REDEVELOP INJ. WELL, 35H1 (I ZONE)	10,990.82								
		F54628172	REDEVELOP INJ. WELL, 34G - A.B.P.	14,648.81								
		F54628174	REDEVELOP INJ. WELL, 33V - A.B.P.	19,594.06								
		F54628179	REDEVELOP INJ. WELL, 33Z2 - A.B.P.	22,350.65								
		F54628181	REDEVELOP INJ. WELL, 33Y - A.B.P.	38,738.43								
		F54628184	REDEVELOP INJ. WELL, 33Z - A.B.P.	29,149.80								
		F54654876	REDEVELOP INJ. WELL, 33X - A.B.P.	30,635.61								
		F54703607	REDEVELOP INJ. WELL, 33U - A.B.P.	21,099.01								
		F54714126	REDEVELOP INJ. WELL, 33S - A.B.P.	18,471.73								
		F54714128	REDEVELOP INJ. WELL, 33S1 - A.B.P.	8,692.06								
		F54726734	REDEVELOP INJ. WELL, 33Q1 - A.B.P.	11,395.65								
		F54730968	REDEVELOP INJ. WELL, 33Q - A.B.P.	12,621.60								
		F5064022	Redevelopment of Injection Wells (A	65,050.05								
			Subtotal #11	**712,142.63**	400,000	178.0	**194,189.35**	140,000	138.7	517,953	260,000	199.2
12.	Processing of data and preparation of reports	H0321553	DATA PROC. & PREPAR. REPORT	81,758.02								
			Subtotal #12	**81,758.02**	60,000	136.3	**22,294.04**	21,000	106.2	59,464	39,000	152.5
13.	Special Programs	H0321591	PLANNING-ABP	32,802.70								
	(No cost to OCWD	H0321590	PLANNING (BARRIER)	14,072.92								
	unless pre-arranged)	H0321022	Evaluation of ABP Wells & Facilitie	94,807.81								
			Subtotal #13	**141,683.43**	235,000	60.3	**0.00**	0	0.0	141,683	235,000	60.3
14.	Reclaim Water Program	H0321556	RECLAIM WATER PROGRAM	26,698.32								
			Subtotal #14	**26,698.32**	10,000	267.0	**7,280.18**	3,500	208.0	19,418	6,500	298.7
15.	Projects & Studies (Reimbursable amounts include labor expenses, plus approved contract expenses that are not addressed under a separate agreement).	HF13509001	Injection Well Condition Assessment	2,921.35								
		H0321022	Evaluation of ABP Wells & Facilitie	21,520.88								
		X5009642	Cathodic protection system Ph.2	6,760.99								
		EF02610112	Additional Wells at Alamitos Barrie	153,443.62								
			Subtotal #15	**184,646.84**	60,000	307.7	**50,350.10**	21,000	239.8	134,297	39,000	344.4
			TOTAL	**2,374,997.29**	1,775,200	133.8	**588,352.08**	521,875	112.7	1,786,645	1,253,325	142.6
	Liability Insurance Premium for 2011-12			**26,699.00**			**-13,349.50**			13,350		
	Balance due from Orange County Water District						**575,002.58**					

NOTES:

[1] OCWD share represents 27% of the total costs in all Items except for 4, 5, 6, 10, and 13. The percentage is based on amount of overall barrier injection water provided to Orange County portion of the ABP during this fiscal year.

[2] Per Agreement No. 8458 between the LACFCD and the OCWD, all costs included in Items 4, 5, 6 and 13 are not reimburseable with respect to OCWD and the OCWD cost for Item 10 is fixed at $375.00.

TOTAL OPERATION AND MAINTENANCE COST	$ 2,374,997.29
ORANGE COUNTY'S SHARE OF THE OPERATION AND MAINTENANCE COST	$ 588,352.08
Less: Los Angeles County's Share of the FY11-12 Liability Insurance	$ (13,349.50)
Less: Advance Deposit Paid by OCWD (50% of the OCWD FY11-12 budget)	$ (271,438.00)
BALANCE DUE FROM ORANGE COUNTY WATER DISTRICT	**$ 303,564.58**

$279,454.65 = LAC's total expenses on C.I . projects

$50,350.10 = OCWD's portion of our $279,454.65 18% projects cost

* AS OF FY09-10, SHOWING CAPITAL IMPROVEMENT PROJECTS AS THEIR OWN CATEGORY AND ALSO SPLITTING UP LABOR EXPENSES FROM CONTRACT EXPENSES FOR APPLICABLE PROJECTS (WHERE SEPARATE COST-SHARING AGREEMENTS ARE IN PLACE FOR CONTRACT AMOUNTS)

2012-13 Costs To Date (July-Aug 2012)
2013-14 OPERATION AND MAINTENANCE BUDGET

JMC	Fiscal	LACFCD		OCWD		WRD		TOTAL	
No.	Year	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual
1.	Analysis and direction of injection operation ($)								
	2010-11	60,000	39,977	40,000	19,911			100,000	59,888
	2011-12	65,000	52,575	35,000	19,711			100,000	72,286
	2012-13	58,500	2,788	31,500	1,527			90,000	4,315
	2013-14	*52,000*		*28,000*				*80,000*	
2.	Maintenance and repair of injection wells ($)								
	2010-11	90,000	275,121	60,000	137,030			150,000	412,151
	2011-12	117,000	284,218	63,000	106,558			180,000	390,775
	2012-13	162,500	36,595	87,500	20,039			250,000	56,634
	2013-14	*195,000*		*105,000*				*300,000*	
3.	Operations of Injection Well Facilities ($)								
	2010-11	120,000	16,844	80,000	8,389			200,000	25,233
	2011-12	130,000	25,116	70,000	9,416			200,000	34,532
	2012-13	32,500	2,535	17,500	1,388			50,000	3,923
	2013-14	*26,000*		*14,000*				*40,000*	
4.	Analysis and direction of extraction operation ($)								
	2010-11	0	0					0	0
	2011-12	0	0					0	0
	2012-13	0	0					0	0
	2013-14	*0*						*0*	
5.	Redevelopment, maintenance, and repair of extraction wells ($)								
	2010-11	10,000	0					10,000	0
	2011-12	5,000	0					5,000	0
	2012-13	5,000	0					5,000	0
	2013-14	*5,000*						*5,000*	
6.	Operations of Extraction Wells ($)								
	2010-11	5,200	4,552					5,200	4,552
	2011-12	5,200	6,219					5,200	6,219
	2012-13	5,200	519					5,200	519
	2013-14	*5,200*						*5,200*	
7.	Maintenance and repair of distribution system ($)								
	2010-11	210,000	272,378	140,000	135,663			350,000	408,041
	2011-12	227,500	231,004	122,500	86,607			350,000	317,612
	2012-13	130,000	55,268	70,000	30,264			200,000	85,532
	2013-14	*162,500*		*87,500*				*250,000*	
8.	Maintenance of Observation Wells ($)								
	2010-11	42,000	0	28,000	0			70,000	0
	2011-12	65,000	138,409	35,000	51,892			100,000	190,300
	2012-13	32,500	0	17,500	0			50,000	0
	2013-14	*97,500*		*52,500*				*150,000*	
9.	Collection of groundwater data ($)								
	2010-11	54,000	96,396	36,000	48,012			90,000	144,408
	2011-12	58,500	105,834	31,500	39,679			90,000	145,513
	2012-13	65,000	10,933	35,000	5,987			100,000	16,920
	2013-14	*65,000*		*35,000*				*100,000*	
10.	Yard Maintenance ($)								
	2010-11	29,625	59,520	375	375			30,000	59,895
	2011-12	39,625	70,455	375	375			40,000	70,830
	2012-13	39,625	6,613	375	375			40,000	6,988
	2013-14	*44,625*		*375*				*45,000*	
11.	Injection Well Redevelopment ($)								
	2010-11	240,000	319,717	160,000	159,242			400,000	478,959
	2011-12	260,000	517,953	140,000	194,189			400,000	712,143
	2012-13	292,500	72,634	157,500	39,773			450,000	112,407
	2013-14	*325,000*		*175,000*				*500,000*	
12.	Processing of data and preparation of reports ($)								
	2010-11	36,000	41,719	24,000	20,779			60,000	62,497
	2011-12	39,000	59,464	21,000	22,294			60,000	81,758
	2012-13	45,500	557	24,500	305			70,000	863
	2013-14	*45,500*		*24,500*				*70,000*	
13.	Special Programs ($)								
	2010-11	230,000	888,644	200,000		200,000		230,000	888,644
	2011-12	95,000	141,683	70,000		70,000		235,000	141,683
	2012-13	1,600,000	10,107			300,000		2,100,000	10,107
	2013-14	*50,000*		*0*				*50,000*	
14.	Oversight of Reclaim Water Program ($)								
	2010-11	6,000	4,767	4,000	2,374			10,000	7,141
	2011-12	6,500	19,418	3,500	7,280			10,000	26,698
	2012-13	5,200	988	2,800	541			8,000	1,528
	2013-14	*7,800*		*4,200*				*12,000*	
15.	Projects and Studies ($)								
	2010-11	0	189,539	0	94,404	0	6,902	400,000	290,845
	2011-12	39,000	134,297	21,000	50,350	0		60,000	184,647
	2012-13	78,000	8,395	42,000	4,597	0		120,000	12,992
	2013-14	*46,800*		*25,200*				*72,000*	
16.	Total ABP Expenditure ($)								
	2010-11	1,132,825	2,209,173	772,375	626,180	200,000	6,902	2,105,200	2,842,255
	2011-12	1,152,325	1,786,645	612,875	588,352	70,000		1,835,200	2,374,997
	2012-13	2,552,025	207,934	486,175	104,795	300,000		3,338,200	312,729
	2013-14	*1,127,925*		*551,275*		*0*		*1,679,200*	
TOTALS	Total ABP Operations and Maintenance ($) [Item 16-Item 13]								
	2010-11	902,825	1,320,529	572,375	626,180	0	6,902	1,475,200	1,953,611
	2011-12	1,057,325	1,644,962	542,875	588,352	0	0	1,600,200	2,233,314
	2012-13	952,025	197,826	486,175	104,795	0		1,438,200	302,621
	2013-14	*1,077,925*		*551,275*		*0*		*1,629,200*	
	Volume of Water (ac-ft)								
	2010-11			2,800	1,684	4,200	3,382	7,000	5,066
	2011-12			2,400	1,182	3,600	3,153	6,000	4,335
	2012-13			2,400	371	3,600	677	6,000	1,048
	2013-14			*2,100*		*3,900*		*6,000*	

NOTE: The FY11-12 budget was the first to include the addition of Category 15 (Projects and Studies). All items within Category 15 were previously included in other categories, but corresponding amounts have been redistributed accordingly (but do not impact previous totals). As a result, past amounts shown hereon may not match what is shown on past budget sheets, but reflect the more detailed breakdown of effective costs/budgets. Approved project-related labor costs and contract costs not governed by separate agreements are addressed in Category 15. Contract costs governed by separate agreements are addressed as part of Category 13.